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WITH

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By a SOCIETY of GENTLEMEN.

The SECOND EDITION,
With many ADDITIONS, CORRECTIONS, and other IMPROVEMENTS.

——————*Huc undique Gaza*
Congeritur ——————— VIRG.

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A NEW AND COMPLETE

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D, One of the letters of the alphabet, the fourth in order, and the third consonant. It is formed in the voice, by applying the top of the tongue to the fore-part of the palate, and then separating them with a gentle gust of the breath, the lips being at the same time open.

Grammarians generally rank D among the lingual letters, because the tongue has the principal share in its pronunciation; but the abbot de Dangeau makes it a palatal one. It has but one sound, somewhat related to that of T.

The form of our D is the same with that of the Latins, as appears by antient medals and inscriptions. And the D of the Latins is only the Greek Δ made a little rounder, by being made quicker, and at two strokes only.

The letter D has the same name, and possesses the same place, in the Hebrew, Chaldee, Samaritan, Syriac, Greek, and Latin alphabets, though somewhat differently pronounced; as in the Hebrew, Chaldee, and Samaritan Daleth, in the Syriac Dolath, and in the Greek Delta.

As a numeral, D denotes 500; and with a dash over it, thus $\overline{D}$, 5000. Used in abbreviation, it has various significations: thus, D. stands for doctor, as M. D. doctor of medicine; D. T. doctor of theology; D. D. signifies doctor of divinity, or dono dedit; D. D. D. is used for dat, dicat, dedicat; and D. D. D. D. for dignum deo donum dedit.

Among roman writers D stands for *divus*, *decimus*, *devotus*, *diebus*, and *diutius*. Among musicians D marks, in thorough basses, what the italians call descanto, and intimates, that the treble ought to play alone, as T does the tenor, and B the bass. See the article DESCANT.

D C, in the italian music, an abbreviation of da capo, that is, from the head, or beginning; these words, or letters, being commonly met with at the end of rondeaus, or such airs and tunes as end with the first strain, intimate that the song is to be begun again, and ended with the first part.

DAB, in ichthyology, the english name of a species of pleuronectes, with the eyes on the right side, obtuse teeth, a spine near the anus, and the body defended by rough scales. See PLEURONECTES.

DABUL, a port town in the province of Decan, on the western coast of the hither India, north lat. 17° 30′, east long. 72° 30°.

DACA, a city of the province of Bengal, in the East Indies, situated on a branch of the river Ganges, east long. 89°, and north lat. 23° 30′.

DA CAPO. See D C, *supra*.

DACE, the english name of a species of cyprinus, very common in our rivers: it is longer and more slender than the roach, and has ten rays in the fin beside the anus. See the article CYPRINUS.

The dace is the slenderest and most rounded in the body of all the cyprini; its usual

usual length is about six or seven inches, though it will grow much larger. See plate LXVII. fig. 1.

DACQS, Dax, or Acqs, a city in France, capital of the territories of les Landes, in the province of Gascony, situated on the river Adour, west long. 1° north lat. 43° 45'.

DACTYL, δακτυλος, *dactylus*, in antient poetry, a metrical foot, consisting of one long and two short syllables, as αλκιμος, and mūrmŭrĕ.

The dactyl and spondee are the only feet or measures used in hexameter verses; the former being esteemed more sprightly, and the latter more solemn and grave. Accordingly, where great activity is signified, we find the dactyls used with much propriety, as in the following verses of Virgil.

Quadrupedante putrem sonitu quatit ungula campum.

DACTYLI, in antiquity, a name attributed to the first priests of the goddess Cybele, who were particularly called *Dactyli Idæi*, because she was principally honoured on mount Ida in Phrygia. The name Dactyli is supposed to be given them on this occasion, that to prevent Saturn from hearing the cries of Jupiter, whom Cybele had committed to their custody, they used to sing verses of their own invention, which, by their unequal measures, seemed to resemble the foot Dactylus.

Sophocles says they were called Dactyli, from the greek δάκτυλος, finger, by reason their number was equal to that of the fingers, *viz.* ten, five boys, and five girls; he adds it is to them we owe the invention of iron, and the manner of working it. It is a conjecture, that the curetes and corybantes were not the same with the dactyli idæi; that 100 men born in Crete were first called dactyli; that each of them had nine children, who were the curetes, and that each of the curetes had ten children, who were also called dactyli idæi. M. Beger makes the dactyli inventors of the art of shooting with bows and arrows.

DACTYLIC VERSES, in antient poetry, hexameter verses ending with a dactyl. See DACTYL and HEXAMETER.

DACTYLIOMANCY, *dactyliomantia*, a sort of divination, performed by means of a ring; consisting chiefly in holding the ring suspended by a fine thread over a round table, on the edge whereof were made several marks with the twenty-four letters of the alphabet; and as the ring, in shaking or vibrating over the table, happened to stop over certain of the letters, these being joined together, composed the answer required.

DACTYLIS, in botany, a genus of the triandria-digynia class of plants, the flower of which is a bivalve glume, and its fruit a single roundish seed, contained in the cup and flower.

DACTYLUS, DACTYL, in poetry. See the article DACTYL.

DACTYLUS, among antient botanists, the same with DATE. See DATE.

DADO, in architecture, the same with the dye. See the article DYE.

DADUCHI, in antiquity, priests of the goddess Ceres, so called, because, at the feasts and sacrifices of that goddess, they ran about the temple, carrying a lighted torch, which they delivered from hand to hand, till it had passed through them all. This they did in memory of Ceres's searching for her daughter Proserpine, by the light of a torch, which she kindled in mount Ætna.

DÆDALA, δαιδαλα, in antiquity, two festivals in Bœotia, one of which was observed by the Platæans at Alalcomenus, where was the largest grove in all Bœotia. Here they assembled, and exposing to the open air pieces of sodden flesh, carefully observed whither the crows that came to feed upon them took their flight, and then hewed down all those trees on which any of them alighted, and formed them into statues, which by the antient greeks were called *dædala*. The other solemnity was by far the greatest and most remarkable of the two, being celebrated only once in sixty years.

DÆDIS, Δαιδις, among the greeks, a solemn festival that lasted three days, during all which time torches were kept burning, which gave occasion to the name.

DÆMON, δαιμον, a name given by the antients to certain spirits, or genii, which, they say, appeared to men, either to do them service, or to hurt them. The Platonists distinguish between gods, dæmons, and heroes. The gods are those whom Cicero calls *Dii majorum gentium*. The dæmons are those whom we call angels. See the article ANGEL.

Christians, by the word dæmon understand only evil spirits, or devils. Justin Martyr speaks of the nature of dæmons, as if he thought them not absolutely spiritual and incorporeal, for which reason he attributes such actions to them as

as cannot be performed without the intervention of a body. It was a fabulous notion among the antient Hebrews, that Adam begot dæmons and ſpirits on certain ſuccubuſes. It is difficult to come at a ſatisfactory account of the dæmonology of that people, and therefore it is no eaſy matter to explain what is meant by the worſhipping of dæmons, or devils, which is the laſt ſpecies of idolatry, according to the diviſion of the rabbins.

"The poets, ſays Minucius Fælix, acknowledge the exiſtence of dæmons; the philoſophers make it a matter of diſpute. Socrates was convinced of it, for he had a dæmon always at hand, by whoſe advice he governed himſelf in all his actions: the magi are not only acquainted with dæmons, but perform all their magical operations by the help of dæmons."

The mahometans allow ſeveral ſorts of dæmons; and the miners of Hungary, pretend that, while they are at work in the mines, they often ſee dæmons in the ſhape of little negro boys, doing them no other harm than often extinguiſhing their lights.

DÆMONIAC, a word applied to a perſon ſuppoſed to be poſſeſſed with an evil ſpirit, or dæmon. See DÆMON.

In the romiſh church there is a particular office for the exorciſm of Dæmoniacs. See the article EXORCISM.

DÆMONIACS, in church hiſtory, a branch of the anabaptiſts, whoſe diſtinguiſhing tenet is, that the devils ſhall be ſaved at the end of the world.

DÆSION, the macedonian name of the month called by the Athenians, antheſterion. See the article ANTHESTERION.

DAFFODIL, the ſame with the narciſſus of botaniſts. See NARCISSUS.

DAFFODIL LILY, the lilio-narciſſus of botaniſts. See LILIO-NARCISSUS.

Sea-DAFFODIL, a genus of plants called by latin writers pancratium. See the article PANCRATIUM.

DAGO, or DAGERWORT, the capital of an iſland of the ſame name in the Baltic, near the coaſt of Livonia, ſubject to Ruſſia, eaſt long. 21° 30′, and north latit. 58° 45′.

DAHGESTAN, a country of Aſia, bounded by Circaſſia on the north, by the Caſpian Sea on the eaſt, by Chirvein, a province of Perſia on the ſouth, and by Georgia on the weſt. Its chief towns are Tarku and Derbent, both ſituated on the Caſpian Sea.

DAHOME, a kingdom of Africa, on the Guinea-coaſt.

DAILE, in the ſea-language, ſignifies the trough for carrying the water off the decks.

DAIRY, a houſe or building where milk, butter, cheeſe, &c. are made or kept. See the articles MILK, BUTTER, &c.

DAISY, the engliſh name of a genus of plants, called by authors bellis. See the article BELLIS.

DAKER-HEN, a bird, otherwiſe called ortygometra. See ORTYGOMETRA.

DALEBURGH, the capital of the province of Dalia, in Sweden, ſituated on the weſtern ſide of the Wener-lake, fifty miles north eaſt of Gottenburgh, eaſt lon. 13°, and north lat. 59°.

DALECARLIA, a province of Sweden, abounding with iron and copper mines.

This is alſo the name of a river, which gives name to the above province.

DALECHAMPIA, in botany, a genus of the polygamia-monoecia claſs of plants. There is no corolla, either in the male or female flower: the fruit is a globoſo-triangular ſcabrous capſule, with three cells: the ſeeds are roundiſh and ſolitary.

DALIA, a province of Sweden, bounded on the north by Dalecarlia, on the eaſt by Wermeland and the Wener-lake, on the ſouth by Gothland, and on the weſt by Norway.

DALKEITH, a town of Scotland, in the county of Lothian, four miles ſouth eaſt of Edinburgh, weſt long. 2° 40′ and north lat. 55° 50′

DALIBARDA, in botany, a genus of the icoſandria-polygynia claſs of plants, the calyx of which conſiſts of a ſingle leafed perianthium, divided into five ſegments; the corolla conſiſts of five oval, equal petals, inſerted into the cup: there is no pericarpium; the ſeeds are five in number, oval, ſmooth, and almoſt of the length of the cup.

DALMATIA, a frontier province of Europe, moſtly ſubject to the Turks, but ſome towns on the ſea-coaſt to the Venetians: it is bounded by Boſnia on the north, by Servia on the eaſt, by Albania on the ſouth, and by Morlachia and the gulph of Venice on the weſt.

DAM, or DIKE. See the article DIKE.

DAMA, the FALLOW-DEER, in zoology, a ſpecies of the deer-kind, diſtinguiſhed by its ramoſe and compreſſed, or palmated horns. See CERVUS.

DAMAGE, in law, is generally underſtood

ſtood of a hurt, or hindrance attending a perſon's eſtate: but, in common law, it is a part of what the jurors are to inquire of in giving verdict for the plaintiff or defendant, in a civil action, whether real or perſonal: for after giving verdict on the principal cauſe, they are likewiſe aſked their conſciences, touching coſts and damages, which contain the hindrances that one party hath ſuffered from the wrong done him by the other. See the article COSTS.

DAMAGE-CLEER, was a fee of the tenth part in the common pleas, and twentieth in the king's-bench and exchequer, formerly paid out of all the damages, exceeding five marks, recovered in thoſe courts, in actions of the caſe, covenant, treſpaſs, and all others wherein the damages were uncertain.

DAMAGE FEASANT, is when a ſtranger's beaſts get into another man's ground, without licence of the owner or occupier of the ground, and there do damage by feeding, or otherwiſe, to the graſs, corn, wood, &c. in which caſe the tenant whom they damage may therefore take, diſtrain, or impound them, as well in the night as in the day; but in other caſes, as for rents and ſervices, and ſuch like, none may diſtrain in the night.

DAMAN, a port town of the hither India, in the province of Guzurat, or Cambay, ſituated on the weſt coaſt, about eighty miles ſouth of Surat, in 72° 20′ eaſt long. and 20° north lat.

It is ſubject to the Portugueſe.

DAMASCUS, or SCHAM, the capital city of the ſouth part of Syria, ſituated ninety miles north eaſt of Jeruſalem, in a pleaſant, extenſive, and fruitful plain; eaſt longit. 37° 20′, and north latit. 33° 15′.

DAMASK, a ſilk-ſtuff, with a raiſed pattern, ſo as that the right ſide of the damaſk, is that which hath the flowers raiſed or ſattined.

Damaſk ſhould be of dreſſed ſilk, both in warp and woof; and in France, half an ell in breadth: they are made at Chalons in Champagne, and in ſome places in Flanders, as at Tournay, &c. intirely of wool, $\frac{7}{8}$ of an ell wide, and 20 ells long.

DAMASK is alſo applied to a very fine ſteel, in ſome parts of the Levant, chiefly at Damaſcus in Syria; whence its name. It is uſed for ſword and cutlaſs blades, and is finely tempered. See STEEL.

DAMASKEENING, or DAMASKING, the art or operation of beautifying iron, ſteel, &c. by making inciſions therein, and filling them up with gold and ſilver wire; chiefly uſed for adorning ſword-blades, guards and gripes, locks of piſtols, &c.

Damaſkeening partakes of the moſaic, of engraving, and of carving: like the moſaic, it hath inlaid work; like engraving, it cuts the metal repreſenting divers figures; and as in chaſing, gold and ſilver is wrought in relievo. There are two ways of damaſking, the one, which is the fineſt, is when the metal is cut deep with proper inſtruments, and inlaid with gold and ſilver wire: the other is ſuperficial only.

DAMBEA, the capital of Abyſſinia, or Ethiopia, ſituated at the head of a lake, to which it gives name: eaſt long. 34°, and north lat. 15°

DAMELOPRE, a kind of bilander, uſed in Holland for conveying merchandize from one canal to another; being very commodious for paſſing under the bridges.

DAMIANISTS, in church-hiſtory, a branch of the antient acephali-ſeveritæ. They agreed with the catholics in admitting the IVth council, but diſowned any diſtinctions of perſons in the Godhead; and profeſſed one ſingle nature, incapable of any difference; and yet, they called God, the Father, Son and Holy Ghoſt.

DAMIETTA, a port-town of Egypt, ſituated on the eaſtern mouth of the river Nile, four miles from the ſea, and a hundred miles north of Grand Cairo; eaſt long. 32°, and north lat. 31°.

DAMNATA TERRA, among chemiſts, the ſame with caput mortuum. See the article CAPUT.

DAMPS, in natural hiſtory, noxious ſteams and exhalations, frequently found in mines, pits, wells, and other ſubterraneous places.

Damps are generally reckoned of four kinds. The firſt, which is the moſt ordinary, the workmen in the mines know when it is coming, by the flame of their candle's becoming orbicular, and by its leſſening gradually till it goes quite out; as alſo, by the difficulty of breathing. Thoſe that eſcape ſwooning, ſeldom ſuffer any harm by it: but ſuch as ſwoon away, though they miſs of downright ſuffocation, are, on their recovery, tormented with very violent convulſions.

Their

Their way of cure is to lay the perſon down on the earth, in a prone poſture, with a hole dug in the ground under his mouth; if this fail, they fill him full of good ale, and if that will not do, they conclude the caſe deſperate.

The ſecond kind is the peaſe-bloom damp, being ſo called from its ſmell: this damp, they ſay, always comes in the ſummer-time, but hath never been known to be mortal. The miners in the Peak of Derbyſhire, fancy it ariſes from the great number of red trefoil flowers, called by them honeyſuckles, with which the limeſtone meadows of the peak abound. Probably the ſmell of this damp gives timely notice to get out of the way.

The third is the moſt peſtilential, and the ſtrangeſt of all, if what is ſaid of it be true. They who pretend to have ſeen it, deſcribe it thus. In the higheſt parts of the roof of thoſe paſſages in a mine which branch out from the main grove, they ſee a round thing that hangs about the bigneſs of a foot-ball, covered with a film of the thickneſs and colour of a cobweb. If this bag ſhould be broke by a ſplinter, or any other accident, the damp immediately flies out, and ſuffocates all the company. The miners have a way of breaking it at a diſtance, by means of a ſtick and long rope; and when they have done this, they purify the place with fire. They will have it, that it flows from the ſteam of their bodies and candles, aſcends up into the higheſt part of the vault, and there condenſes; and that in time, a film growing over it, it becomes peſtilential.

The fourth is the fulminating, or fire-damp, whoſe vapour, being touched by the flame of a candle, preſently takes fire, and has all the effects of lightening, or fired gun-powder. Theſe are frequently met with in the coal-mines, and ſometimes, though rarely, in the lead-mines.

The pernicious damps in mines, ſhew abundantly, that nature affords inflammable air in ſome caſes; and we have found by experiments, that art can do the ſame, and that, very probably, on the ſame principles with the natural. Sir James Lowther, having collected the air of ſome of theſe damps in bladders, preſerved it ſo well, that when brought up to London, it would take fire at the flame of a candle, on being let out at the orifice of a piece of tobacco-pipe. It is well known to all that are verſed in chemical experiments, that moſt metals emit a great quantity of ſulphurous vapours, during the effervescence they undergo in the time of their ſolutions, in their reſpective menſtruums: this vapour, being received into bladders, in the ſame manner with the natural air of Sir James Lowther, has been found to take fire, in the like way, on being let out in a ſmall ſtream, and anſwering all the phænomena of the natural kind.

DAMSEL, from the french *damoiſel*, or *damoiſeau*, an appellation antiently given to all young people of either ſex, that were of noble or genteel extraction, as the ſons and daughters of princes, knights, and barons: thus we read of Damſel Pepin, Damſel Louis le Gros, Damſel Richard prince of Wales.

From the ſons of kings this appellation firſt paſſed to thoſe of great lords and barons, and at length to thoſe of gentlemen, who were not yet knights.

At preſent, damſel is applied to all maids or girls, not yet married, provided they be not of the vulgar.

DANAE, in antiquity, a coin ſomewhat more than an obulus, uſed to be put into the mouths of the dead, to pay their paſſage over the river Acheron.

DANCE, an agreeable motion of the body, adjuſted by art to the meaſures or tune of inſtruments, or of the voice.

Athenæus concludes, that in the early ages of antiquity, they accounted dancing an exerciſe becoming perſons of honour and wiſdom, and that, as ſuch, it had been eſteemed by the greateſt men in all ages. Thus, Homer calls Merion a fine dancer, and ſays, that the graceful mein and great agility which he had acquired by that exerciſe, diſtinguiſhed him above the reſt in the armies of either Greeks or Trojans. Dancing was in very great eſteem among the Greeks, even the Lacedemonians encouraged it: but, at Rome, we find the cuſtom was quite otherwiſe; for there, to uſe the words of Cicero, no man dances unleſs he is mad or drunk: Cicero reproaches Gabinius with having danced; and we read, that Domitian excluded ſeveral members from the ſenate for having danced.

Dancing in general, was by the antients divided into cubiſtic, ſpheriſtic, and orcheſtic: the cubiſtic dance was performed with certain wreſtlings and contorſions of the body; the ſpheriſtic with a ſort of ball, or bowl play; but the orcheſtic was

was moſt uſual, and what indeed was dancing properly ſo called.

Dancing is uſually an effect and indication of joy, though Mr. Palleprat aſſures us, that there are nations in South America, who dance, to ſhew their ſorrow. It has been in uſe among all nations civilized and barbarous, though held in eſteem among ſome, and in contempt among others. It has often been, and ſtill is, ſometimes, made an act of religion. Thus David danced before the ark, to honour God, and expreſs his exceſs of joy, for its return into Sion. Among the Pagans it made a part of the worſhip paid to the Gods, it being uſual to dance round the altars, and ſtatues; and at Rome, the ſalii, who were prieſts of Mars, danced through the ſtreets in honour of that God. The poets made the Gods themſelves dance. The Chriſtians are not free from this ſuperſtition, for in popiſh countries certain feſtivals, particularly thoſe of the ſacrament, and paſſion of our Lord, are celebrated with dancing.

Rope-DANCER, *ſchoenobates*, a perſon who walks, leaps, dances, and performs ſeveral other feats upon a ſmall rope, or wire.

The antients had their rope-dancers, who had four ſeveral ways of exerciſing their art; the firſt vaulted, or turned round the rope, like a wheel round its axis, and there hung by the heels or neck. The ſecond flew or ſlid from above, downwards, reſting on their ſtomach, with the arms and legs extended. The third ran along a rope, ſtretched in a right line, or up and down. Laſtly, the fourth, not only walked on the rope, but made ſurpriſing leaps and turns thereon.

This art is lately much improved, as well in this nation as in France, and ſeveral other parts of Europe; witneſs the admirable feats of ſeveral rope-dancers, now in this country, who, ſtanding only with one foot on the wire, beat the drum, ſound the trumpet, play the violin, &c. and all the while the wire is in full ſwing. The other feats which they perform on the wire by the help of a balance, are too many to be enumerated here.

DANCETTE, in heraldry, is when the outline of any bordure, or ordinary, is indented very largely, the largeneſs of the indentures being the only thing that diſtinguiſhes it from indented. See the article INDENTED.

There is alſo the bearing of a bend called double dancette: thus, he beareth azure, a bend double dancette argent.

DANCHE, in heraldry, the ſame with dantelle, according to Guillim: but Columbier makes it the ſame with indented. See the articles INDENTED and DANTELLE.

DANEGELT, a tax, or tribute, on every hide of land, impoſed on our anceſtors the Saxons by the Danes, on their frequent invaſions, as the arbitary terms of peace, and departure. It was firſt impoſed as a continual yearly tax upon the whole nation, under king Ethelred. It was levied by William I. and II. but was releaſed by king Henry the firſt; and finally aboliſhed by king Stephen.

DANIEL, *or book of* DANIEL, a canonical book of the old teſtament, ſo denominated from its author Daniel, who was a very extraordinary perſon, and was favoured of God, and honoured of men, beyond any that had lived in his time. His prophecies concerning the coming of the Meſſiah, and the other great events of after times, are ſo clear and explicit, that Porphyry objected to them, that they muſt have been written after the facts were done. The ſtile of Daniel is not ſo lofty and figurative as that of the other prophets; it is clear and conciſe, and his narrations and deſcriptions ſimple and natural; and, in ſhort, he writes more like an hiſtorian than a prophet.

The Jews do not reckon Daniel among the prophets; part of his book, that is from the 4th verſe of the 2d chapter to the end of the 7th chapter, was originally written in the chaldee language, the reaſon of which was, that in that part he treats of the chaldean or babyloniſh affairs; all the reſt of the book is in hebrew. The ſix firſt chapters of the book of Daniel are an hiſtory of the kings of Babylon, and what befel the Jews under their government. In the ſix laſt, he is altogether prophetical, foretelling not only what ſhould happen to his own church and nation, but events in which foreign princes and kingdoms were concerned.

DANK, a piece of ſilver current in Perſia, and ſome parts of Arabia, weighing the ſixteenth part of a drachm. It is alſo a weight uſed by the Arabians to weigh jewels and drugs.

DANTELLE, in heraldry, the ſame with dancette. See the article DANCETTE.

DANTZICK, the capital of regal Pruſſia, in

in the kingdom of Poland, ſituated on the weſtern ſhore of the river Weſel, or Viſtula, which a little below falls into the Baltic Sea: eaſt long. 19°, and north lat. 54°.

It is an excellent harbour, and has the beſt foreign trade within the Baltic.

DANUBE, one of the largeſt rivers in Europe, which, taking its riſe in the Black Foreſt in Swabia, runs eaſtward through Bavaria, Auſtria, Hungary, and Turky in Europe; diſcharging itſelf by ſeveral channels into the Pontus Euxinus, or Black Sea.

DAPHNE, Spurge Laurel, in botany, a genus of the octandria monogynia claſs of plants, the flower of which conſiſts of a ſingle petal; the tube is cylindric, imperforated, and longer than the limb, which is divided into four oval, acute, plane, patent ſegments: the fruit is a roundiſh berry, containing one cell; the ſeed is ſingle, round and fleſhy.

This plant is a ſtrong cathartic, and too rough to be given with ſafety.

DAPIFER, the dignity or office of grand maſter of a prince's houſhold. This title was given by the emperor of Conſtantinople to the czar of Ruſſia, as a teſtimony of favour. In France the like officer was inſtituted by Charlemaign, under the title of Dapiferat; and the dignity of dapifer is ſtill ſubſiſting in Germany, the elector of Bavaria aſſuming the title of arch-dapifer of the empire, whoſe office is, at the coronation of the emperor, to carry the firſt diſh of meat to table, on horſeback.

DAPPLE-BAY, in the manege. When bay horſes have marks of a dark bay, they are called dapple bays.

Dapple-black. When a black horſe has got ſpots or marks, more black or ſhineing than the reſt of his ſkin, he is called a dapple-black.

DARAPTI, among logicians, one of the modes of ſyllogyſms of the third figure, whoſe premiſes are univerſal affirmatives, and the concluſion is a particular affirmative: thus,

Dar- Every body is diviſible;
ap- Every body is a ſubſtance;
ti. Therefore, ſome ſubſtance is diviſible.

DARBY, the capital of Darbyſhire, ſituated on the river Darwent: weſt long. 1° 25′, and north lat. 53°.

It gives the title of earl to the noble family of Stanley, and ſends two members to parliament.

DARDANARIUS, or Monopolist, a name antiently given to ſuch as occaſioned a ſcarcity of proviſions, particularly corn, by laying it up, to raiſe its price, in order to ſell it again at an extravagant rate. See Monopoly.

DARDANELLS, two caſtles at the entrance of the Helleſpont, where all ſhips going to Conſtantinople are examined: eaſt long. 27°, and north lat. 40° 5′.

DARE, in ichthyology, the ſame with dace. See the article Dace.

DARIEN, a province of Terra Firma, in ſouth America, being the narrow iſthmus, which joins north and ſouth America.

DARII, in logic, one of the modes of ſyllogiſm of the firſt figure, wherein the major propoſition is an univerſal affirmative, and the minor and concluſion particular affirmatives: thus,

Da- Every thing that is moved, is moved by another;
ri- Some body is moved:
i. Therefore, ſome body is moved by another.

DARK CHAMBER. See the article Camera Obscura.

Dark Tent, a portable camera obſcura, reſembling a deſk, and fitted with optic glaſſes, to take proſpects of landſkips, buildings, &c.

DARKING, a market-town of Surry, ſituated ten miles eaſt of Guilford, weſt long. 20′, and north lat. 51° 18′.

DARLINGTON, a market-town of the county of Durham, ſituated twenty miles ſouth of the city of Durham: weſt long. 1° 15′, and north lat. 54° 30′.

DARMSTAT, the capital of Heſſe-Darmſtat, in the circle of the upper Rhine in Germany, ſituated on a river of the ſame name, fourteen miles ſouth of Francfort, and thirteen ſouth-eaſt of Mentz: eaſt long. 8° 25′, and north lat. 49° 45′.

DARNEL, the engliſh name of the lolium of botaniſts. See the article Lolium.

DARREIN, in law, a corruption of the french word *dernier*, *laſt*, is uſed in this ſenſe in our law, as *darrein continuance*, &c.

Darrein preſentment, the laſt preſentation to a church, on which an aſſize lies.

DART, in aſtronomy, geometry, &c. See the article Sagitta.

DARTFORD, a market-town of Kent, in the Dover-road, fourteen miles ſouth-

eaſt of London: eaſt long. 16′, and north lat. 51° 25′.

DARTMOUTH, a borough and port-town of Devonſhire, ſituated on the engliſh channel, twenty-ſix miles ſouth of Exeter, which ſends two members to parliament: weſt long. 4°, and north lat. 50° 25′.

DARTUS, or Dartos, in anatomy, the inner coat of the ſcrotum, compoſed of a great number of muſcular or fleſhy fibres, whence ſome conſider it as a cutaneous muſcle. It is by means hereof, that the ſcrotum is contracted or corrugated, which is eſteemed a ſign of health. See the article Scrotum.

DARWENT, a river, which, riſing in the Peak of Darbyſhire, runs from north to ſouth through that county, and falls into the Trent.

DASYPUS, in zoology, the ſame with armadillo. See Armadillo.

DATA, among mathematicians, a term for ſuch things or quantities as are given or known, in order to find other things thereby that are unknown. Euclid uſes the word data (of which he hath a particular tract) for ſuch ſpaces, lines and angles as are given in magnitude, or to which we can aſſign others equal.

In algebra, the given quantities, or data, are expreſſed by the firſt letters of the alphabet, and the unknown quantities by the laſt letters; thus, if the problem be, from the ſum and product of two quantities given, to find the quantities themſelves, the quantities are repreſented by y and z; and $y + z = a$ the ſum given, and $yz = b$, the product given. See the article Equation.

Data alſo expreſſes, in philoſophy and medicine, any quantity which for the ſake of a preſent calculation is taken for granted to be ſuch, without requiring an immediate proof for its certainty, called alſo the given quantity, number or power.

DATE, in law, is the deſcription of the day, month, year of our Lord, and year of the reign of the king, in which a deed or other writing was made. Antiently deeds had no dates but only of the month and year, and now, if in the date of any deed, the year of our Lord is right, though the year of the king's reign be wrong, it ſhall not hurt the ſame. A deed is good, though it has no date of the day, or if that be miſtaken, or though it contains an impoſſible date; but then he that pleads ſuch a deed, muſt ſet forth the time when it was delivered: for every deed or writing has a date in law, and that is the day of the delivery; and where there is none, a plaintiff, it is ſaid, may count it of any date.

In writings of importance, the date ſhould be written in words at length.

In letters, it is uſually written in figures.

An ante-date is a date prior to the real time when the inſtrument was ſigned.

A poſt-date is that poſterior to the real time when the inſtrument was paſſed.

Date, *dactylus*, the fruit of the phoenix, or great palm-tree. See Phoenix.

Dates are eſteemed moderately ſtrengthning and aſtringent, for which reaſon they are preſcribed for diarrhoeas that are habitual, for weakneſſes of the ſtomach, and for ſtrengthening the womb; but at preſent, we make little uſe of them in England. The beſt for medicinal purpoſes are thoſe of Tunis, and the country thereabout, of Egypt and many parts of the eaſt; the dates of Spain, and the ſouth of France, though they look well, being never perfectly ripe, and very ſubject to decay. They are to be choſen large, full, freſh, of a yellow colour on the ſurface, ſoft and tender, not too much wrinkled, and ſuch as have the pulpy part either of a good white throughout, or elſe reddiſh toward the ſurface, and white toward the kernel. Dates the hundred weight pay 1l. 14s. $4\frac{20}{100}$d. on importation; and draw back on exportation 1l. 11s. 6d. They are preſerved in three different ways; ſome preſſed and dry, others preſſed more moderately; but the beſt are thoſe not preſſed at all, only moiſtened with the juice of other dates, as they are packed up in baſkets or in ſkins.

DATE-PLUM, in botany a name uſed by ſome for the dioſpyros, a diſtinct genus of plants. See Diospyros.

DATISCA, in botany, a genus of the dioecia-decandria claſs of plants, the cup of which conſiſts of five leaves: there are no flower-petals; and its fruit is a triangular, unilocular capſule, containing a great number of ſeeds.

DATISI, in logic, a mode of ſyllogiſms in the third figure, wherein the major is an univerſal affirmative, and the minor and concluſion particular affirmative propoſitions. For example,

Da- All who ſerve God are kings;
ti- Some who ſerve God are poor;
si. Therefore ſome who are poor are kings.

DATIVE, among grammarians, the third caſe

cafe in the declenfion of nouns, expreffing the relation of a thing to whofe profit or lofs fome other thing is referred. It is called dative, becaufe ufually governed by a verb, implying fomething to be given to fome perfon. In englifh, the dative is expreffed by the figns *to* or *for.*

DATURA, THORN-APPLE, in botany, a genus of the pentandria-monogynia clafs of plants: the flower confifts of an infundibuliform petal; the fruit is a fubovated, bilocular, quadrivalvular, and commonly prickly capfule, fixed to the bafe of the cup; the feeds are numerous and reniform. See plate LXVII. fig. 2.

The thorn-apple is narcotic, and dangerous to be taken internally; but a cataplafm of its leaves and feed is commended for burns.

DAUCUS, the CARROT, in botany, a genus of plants belonging to the pentandria digynia clafs. The general flower is unequal: the proper one confifts of five inflexo-cordated petals, the exterior ones being the largeft. There is no pericarpium: the fruit is of an oval figure every way covered with rigid hairs, and is divifible into two parts: the feeds are two, of a fuboval figure, convex and hairy on one fide, and plain on the other. See plate LXVII. fig. 3.

There are two kinds of daucus-feeds kept in the fhops, diftinguifhed by the names of daucus creticus, and daucus vulgaris. The feeds of the daucus creticus come principally from Germany and the Levant: thefe feeds are to be chofen frefh, found, and large, not dufty, and of an acrid tafte. They are very apt to breed infects, and muft, on that account, be carefully looked into, as they have no virtue when that is the cafe. The feeds of the cretic and common daucus have the fame general virtues; they are powerful diuretics, and much celebrated as carminatives and uterines: they attenuate thick and vifcid humours, and promote the menfes. Many people efteem the feed of the common daucus a remedy for the ftone: the cretic kind is one of the four leffer hot feeds of the fhops.

DAVENTRY, a market-town of Northamptonfhire, fituated about ten miles north of Northampton: weft long. 1° 15′, and north lat. 52° 12′.

DAUGHTER, *filia*, a female child. See the article CHILD.

As they required greater expences to educate and fettle them in the world, than fons, they were for that reafon more frequently expofed by the antients. Thofe who had no legitimate fons, were obliged, by the athenian laws, to leave their eftates to their daughters, who were confined to marry their neareft relation, otherwife to forfeit their inheritance, as we find to have been practifed among the Jews, many of whofe laws feem to have been tranfcribed by Solon. And if an heirefs happened to be married before her father's death, this did not hinder the neareft relation to claim the inheritance, and even to take the woman from her hufband.

DAUGHTER *of a voice*, among the Jews. See the article BATH-KOL.

DAVIDISTS, in church-hiftory, a fect of chriftian heretics in the XVIth century; fo called from David George, their leader, who began by giving out that he was the Meffiah, and was fent into the world in order to people the kingdom of heaven, which was quite empty of inhabitants, for want of virtuous and good men: he rejected marriage, and denied the refurrection.

DAVID'S, or St. DAVID'S, a city, and bifhop's fee, of Pembrokefhire, fituated near the irifh channel, about twenty miles north weft of Pembroke: weft long. 5° 20′, and north lat. 52°.

ST. DAVID'S is alfo the name of a town and fort fituated on the coaft of Coromandel, in the hither India, about eighty miles fouth of Fort Saint George: eaft long. 79° 40′, and north lat. 11° 45′.

DAVIS'S STRAITS run north weft from Cape Farewell, in 60° north lat. to Baffin's Bay, in 80° north lat. feparating Greenland from North America.

DAVIS'S QUADRANT, the fame with backftaff. See QUADRANT and BACKSTAFF.

DAVIT, in a fhip, that fhort piece of timber with a notch at one end, wherein, by a ftrap, hangs the fifh block. See plate LXVII. fig. 4.

The ufe of this block is to help up the fluke of the anchor, and to faften it at the fhip's bow, or loof. The davit is fhiftable from one fide of the fhip to the other, as there is occafion.

There is alfo a fmall davit in the fhip's boat, that is fet over her head with a fhiver, in which is brought the buoy rope, wherewith to weigh the anchor; it is made faft to the carlings in the boat's bow.

DAUPHIN, a title given to the eldeft fon of France, and heir prefumptive of the crown,

crown, on account of the province of Dauphiny, which, in 1343, was given to Philip of Valois, on this condition, by Humbert, dauphin of the Viennois. The ſeigneurs, or lords of Auvergne, have likewiſe borne the appellation of dauphin, but the dauphins of Auvergne held it not till a good while after thoſe of the Viennois, and even received it from them.

DAUPHIN, in the hiſtory of ſhell-fiſh, a ſpecies of cochlea, or ſnail, with a round mouth. See the article COCHLEA.

DAUPHIN-FORT, a fort built by the French, on the eaſtern coaſt of the iſland of Madagaſcar: eaſt long. 48°, and ſouth lat. 24°.

DAUPHINE, or DAUPHINY, a province of France, bounded by Burgundy on the north, by Piedmont on the eaſt, by Provence on the ſouth, and by the river Rhone, which ſeparates it from Languedoc and the Lyonois, on the weſt.

DAY, according to the moſt natural and obvious ſenſe of the word, ſignifies that ſpace of time during which it continues to be light; in contradiſtinction to night, being that partition of time wherein it is dark; but the ſpace of time in which it is light, being ſomewhat vague and indeterminate, the time between the riſing and ſetting of the ſun is uſually looked on as the day: and the time which lapſes from its ſetting to its riſing again, the night.

The word day is often taken in a larger ſenſe, ſo as to include the night alſo; or to denote the time of a whole apparent revolution of the ſun round the earth, in which ſenſe it is called by ſome a natural day, and by others an artificial one: but to avoid confuſion, it is uſual to call it in the former ſenſe ſimply the day, and in the latter a nychthemeron, by which term that acceptation of it is aptly denoted, as it implies both day and night.

The nychthemeron is divided into twenty-four parts, called hours, which are of two ſorts, equal and unequal, or temporary. See the article HOUR.

Different nations begin their day at a different hour: thus the Egyptians began their day at midnight, from whom Hippocrates introduced that way of reckoning into aſtronomy, and Copernicus and others have followed him: but the greateſt part of aſtronomers reckon the day begun at noon, and ſo count twenty-four hours, till the noon of the next day; and not twice twelve, according to the vulgar computation. The method of beginning the day at midnight prevails alſo in Great Britain, France, Spain, and moſt parts of Europe. The Babylonians began their day at ſun-riſing, reckoning the hour immediately before its riſing again the twenty-fourth hour of the day, from whence the hours reckoned in this way are called the Babylonic. In ſeveral parts of Germany, they begin their day at ſun-ſetting, and reckon on till it ſets next day, calling that the twenty-fourth hour: theſe are generally termed Italian hours. The Jews alſo began their nychthemeron at ſun-ſetting; but then they divided it into twice twelve hours, as we do, reckoning twelve for the day, be it long or ſhort, and twelve for the night; ſo that their hours continually varying with the day and night, the hours of the day were longer than that of the night, for one half year, and the contrary the other; from whence their hours are called temporary; thoſe at the time of the equinoxes became equal, becauſe then thoſe of the day and night are ſo. The Romans alſo reckoned their hours after this manner, as do the Turks at this day. This kind of hours are called planetary, becauſe the ſeven planets were antiently looked upon as preſiding over the affairs of the world, and to take it by turns each of theſe hours, according to the following order: ſaturn firſt, then jupiter, mars, the ſun, venus, mercury, and laſt of all the moon: hence they denominated each day of the week from that planet whoſe turn it was to preſide the firſt hour of the nychthemeron. Thus aſſigning the firſt hour of Saturday to ſaturn, the ſecond will fall to jupiter, the third to mars, and ſo the twenty-ſecond of the ſame nychthemeron will fall to ſaturn again, and therefore the twenty-third to jupiter, and the laſt to mars: ſo that on the firſt hour of the next day, it will fall to the ſun to preſide; and by the like manner of reckoning, the firſt hour of the next will fall to the moon; of the next, to mars; of the next, to mercury; of the next, to venus: hence the days of the week came to be diſtinguiſhed by the latin names of *dies ſaturni*, *ſolis*, *lunæ*, *martis*, *mercurii*, *jovis*, and *veneris*; and among us, by the names of Saturday, Sunday, Monday, *&c.*

DAY, in a legal ſenſe, relates to the day of appearance of parties, or the continuance of

of fuits, where a day is given, *&c.* See the article ESSOIN.

In real actions there are common days and fpecial days given by the judges, in an affife, *&c.*

DAYS *in bank*, are days fet down by ftatute or order of the court, when writs fhall be returned, or when the party fhall appear on the writ ferved. They fay alfo, if a perfon be difmiffed without day, he is finally difcharged.

DAYS *of grace*, are thofe granted by the court at the prayer of the defendant, or plaintiff, in whofe delay it is.

DAYS *of grace*, in commerce, are a cuftomary number of days allowed for the payment of a bill of exchange, *&c.* after the fame becomes due.

Three days of grace are allowed in England; ten in France and Dantzic; eight at Naples; fix at Venice, Amfterdam, Rotterdam, and Antwerp; four at Frankfort; five at Leipfic; twelve at Hamburg; fix in Portugal; fourteen in Spain; thirty in Genoa, *&c.*

DAY-LIGHT, in our law; fome time after fun-fetting, and before fun-rifing, being accounted part of the day, when the hundred is liable for any robberies committed within that time.

DAY'S MAN, in the north of England, an arbitrator or perfon chofen to determine an affair in difpute.

DAYS *of prefixion* in the exchequer, fee the article REMEMBRANCERS.

Dog-DAYS, *dies caniculares*. See the article CANICULAR DAYS.

Lady DAY. See the article LADY.

Quarter-DAY. See the article QUARTER.

Stationary DAYS. See STATIONARY.

Intercalary DAY. See INTERCALARY.

DAY-COAL, among miners, an appellation given to the upper ftratum of the coal, or that which lies next the furface of the earth.

DAZE, among miners, denotes the fame with the telaugia of naturalifts. See the article TELAUGIA.

DEACON, διακονος, one of the three facred orders of the chriftian church. The word is fometimes ufed in the New Teftament for any one that minifters in the fervice of God, in which fenfe bifhops and prefbyters are ftiled deacons; but in its reftrained fenfe, it is taken for the third order of the clergy, as appears from the concurrent teftimony of antient writers, who conftantly ftile them minifters of the myfteries of Chrift, minifters of epifcopacy and the church, and the like. The firft inftitution of this order is recorded in Acts, ch. 6.

As to the office of deacons, the moft common and ordinary was to be attendant on the bifhops and prefbyters in the fervice of the altar, to take care of the holy table and all the ornaments and utenfils belonging to it, and, in the next place, to receive the offerings of the people, and to prefent them to the prieft; at the fame time reciting the names of thofe that offered. In fome churches, tho' not in all, the deacons read the gofpel both before and at the communion fervice; but their moft peculiar office was to affift the bifhop and prefbyters in the adminiftration of the eucharift, at which their bufinefs was to diftribute the elements to the people who were prefent, and carry them to thofe who were abfent. That they were never allowed to confecrate them at the altar, appears from the teftimonies of Hilary, Jerom, and the author of the conftitutions. They were permitted, however, to adminifter folely the facrament of baptifm in fome cafes. Another part of the office of deacons, was to be a fort of monitors and directors to the people in the exercife of their public devotions in the church; for which purpofe they made ufe of certain known forms of words, to give notice when each part of the fervice began. Whence they are fometimes called ἱεροκήρυκες, the holy cryers of the church. Deacons had, by licence and authority from the bifhop, a power to preach, to reconcile penitents and grant them abfolution, and to reprefent their bifhops in general councils. Their office out of the church was to take care of the neceffitous, fuch as orphans, widows, prifoners, and all the poor and fick who had any title to be maintained out of the public revenues of the church; to enquire into the morals and converfation of the people, and to make their report thereof to the bifhop. Whence, on account of the variety of bufinefs, it was ufual to have feveral deacons in the fame church.

In the romifh church, it is the deacons office to incenfe the officiating prieft or prelate; to lay the corporal on the altar; to receive the paten or cup from the fub-deacon, and prefent them to the perfon officiating; to incenfe the choir; to receive the pax from the officiating prelate, and carry it to the fub-deacon; and at the pontifical mafs, when the bifhop gives the bleffing, to put the mitre on his head, and

and to take off the archbiſhop's pall, and lay it on the altar. In England, the form of ordaining deacons, declares that it is their office to aſſiſt the prieſt in the diſtribution of the holy communion; in which, agreeably to the practice of the antient church, they are confined to the adminiſtring the wine to the communicants. A deacon, with us, is not capable of any eccleſiaſtical promotion, yet he may be a chaplain to a family, curate to a beneficed clergyman, or lecturer to a pariſh church. He may be ordained at twenty-three years of age, *anno currente*; but it is expreſsly provided, that the biſhop ſhall not ordain the ſame perſon a prieſt and deacon in the ſame day. Deacons, according to St. Paul, ſhould be chaſte, ſincere, and blameleſs; neither great drinkers, nor given to filthy lucre; they ſhould hold the myſtery of the faith in a pure conſcience, and ſhould be well approved before they are admitted to the miniſtry.

DEACONESS, *a female deacon*, an order of women, who had their diſtinct offices and ſervices in the primitive church. This office appears as antient as the apoſtolical age; for St. Paul calls Phœbe a ſervant of the church of Cenchrea. The original word is διάκονος, anſwerable to the latin word *miniſtra*. Tertullian calls them *viduæ*, widows, becauſe they were commonly choſen out of the widows of the church; and for the ſame reaſon Epiphanius, and the council of Laodicea, calls them πρεσβυτίδας, elderly women, becauſe none but ſuch were ordinarily taken into this office. For, indeed, by ſome antient laws, theſe four qualifications were required in every one that was to be admitted into this order. 1. That ſhe ſhould be a widow. 2. That ſhe ſhould be a widow that had borne children. 3. A widow that was but once married. 4. One of a conſiderable age, forty, fifty, or ſixty years old. Tho' all theſe rules admitted of exceptions. Concerning their ordination, whether it was always performed by impoſition of hands, the learned are much divided in their ſentiments. Baronius and Valeſius think they were not, and make no other account of them than as mere lay-perſons. But the author of the conſtitutions, ſpeaking of their ordination, requires the biſhop to uſe impoſition of hands, with a form of prayer which is there recited. We are not, however, to imagine, that this ordination gave them any power to execute any part of the ſacerdotal office. They were only to perform ſome inferior ſervices of the church, and thoſe chiefly relating to the women for whoſe ſakes they were ordained. One part of their office was to aſſiſt the miniſter at the baptizing of women, to undreſs them for immerſion, and to dreſs them again, that the whole ceremony might be performed with all the decency becoming ſo ſacred an action. Another part of their office was to be private catechiſts to the women catechumens who were preparing for baptiſm. They were likewiſe to viſit and attend women that were ſick and in diſtreſs; to miniſter to the martyrs and confeſſors in priſon; to attend the womens gate in the church; and, laſtly, to aſſign all women their places in the church, regulate their behaviour, and preſide over the reſt of the widows, whence in ſome canons they are ſtiled προκαθήμεναι, governeſſes. This order, which ſince the tenth or eleventh century has been wholly laid aſide, was not aboliſhed every where at once, but continued in the greek church longer than in the latin, and in ſome of the latin churches longer than in others.

DEACONRY, the order or miniſtry of the deacon or deaconeſs. See DEACON, &c.

DEACONRY, *diaconia*, is alſo the name of the chapels and oratories in Rome, under the direction of the ſeveral cardinal deacons in their reſpective quarters. Antiently, they were ſeven in number, as the deaconry of St. Maria in the broad way, the deaconry of St. Euſtachio near the Pantheon, &c. anſwering to the ſeven regions of the city. They had hoſpitals annexed to them for the diſtribution of alms, and an adminiſtrator for temporal concerns, called the father of the deaconry, who was ſometimes a prieſt and ſometimes a layman. At preſent, there are fourteen of theſe deaconries, or hoſpitals, under the direction of as many cardinals.

DEAD-MAN's HEAD, in geography, a cape or promontory near Trigony in Cornwall, between St. Mawes and Fowey.

DEAD-MENS-EYES, in the ſea-language, a kind of blocks with many holes in them, but no ſheevers, whereby the ſhrouds are faſtened to the chains: the crow-feet reeve alſo through theſe holes; and, in ſome ſhips, the main-ſtays are ſet taught in them; but then they have only one hole, thro' which the lanyards are paſſed ſeveral times. See plate LXVII. fig. 5.

DEAD-NETTLE, a genus of plants called by

by botanifts lamium. See LAMIUM.

DEAD-PLEDGE, the fame with mortgage. See the article MORTGAGE.

DEAD-RECKONING, in navigation, the calculation made of a fhip's place by means of the compafs and log; the firft ferving to point out the courfe fhe fails on, and the other the diftance run. From thefe two things given, the fkilful mariner, making proper allowances for the variation of the compafs, leeway, currents, *&c.* is enabled, without any obfervations of the fun or ftars, to afcertain the fhip's place tolerably well. See the articles COURSE, SAILING, COMPASS, CURRENT, LEE-WAY, *&c.*

DEAD-RISING, among failors, that part of a fhip which lies aft, between the keel and the floor-timbers, next adjoining to the ftern-poft, under the bread-room in a fhip of war.

DEAD ROPES, on board a fhip, fuch ropes as do not run in any block.

DEAD-SEA, in geography, a lake of Judea, into which the river Jordan difcharges itfelf; being about feventy miles long, and twenty broad.

The water of this lake is both falt, and naufeoufly bitter; and the bitumen it affords exactly refembles pitch, from which it can only be diftinguifhed by its fulphureous fmell and tafte.

DEAD-TOPS, a difeafe incident to young trees, and cured by cutting off the dead parts clofe to the next good twig or fhoot, and claying them over as in grafting. See the article GRAFTING.

DEAD-WATER, at fea, the eddy-water juft aftern of a fhip, fo called, becaufe it does not pafs away fo fwift, as the water running by her fides does. They fay, that a fhip makes much dead water, when fhe has a great eddy following her ftern.

DEADLY FEUD, in law, a profeffion of an irreconcilable hatred, till a perfon is revenged even by the death of his adverfary. This enmity was allowed in the old faxon laws: for where any perfon was killed, if a pecuniary fatisfaction was not made to the kindred of the flain, it was lawful for them to revenge themfelves, by arms, on the murderer.

DEADLY-CARROT, a plant called by botanifts thapfia. See THAPSIA.

DEADLY-NIGHTSHADE, a name given to the belladonna of botanifts. See the article BELLADONNA.

DEADS, among miners, denotes the earth or other foffile fubftances which inclofe the ore on every fide. Hence, *breaking up the deads*, is the removing thefe fubftances for the conveniency of carrying on their work.

DEAFFORESTED, a term found in lawbooks, fignifying that a place is difcharged from being a foreft, or freed from the foreft-laws.

DEAFNESS, the ftate of a perfon who either wants the fenfe of hearing, or has it greatly impaired.

The caufes of deafnefs are a cutting of the external ear, or an obftruction of the auditory paffage, from wax, or other things; from a rupture of the membrane of the tympanum; or when it is corroded, or ulcerated, or the auditory nerve is obftructed or compreffed. External caufes, are falls from high places; exceffive noife, fuch as the explofion of cannon; likewife acute difeafes near their ftate, which are like to terminate by a critical hæmorrhage.

As to the prognoftics, thofe who are born deaf are rarely cured. A real deafnefs is hard to remedy. A deafnefs in acute difeafes, with crude urine, foretells a delirium: but when the figns of coction are good, it portends a critical hæmorrhage. With regard to the cure, if the obftruction be in the external cavity of the ear, it is difcernible by the fight. If there is occafion to fyringe the ear, a decoction of fage and rofemary flowers will be proper, with equal parts of water and whitewine: but great caution fhould be ufed. Some pump the head with warm bath waters: fome fay, the eggs of ants bruifed, and put into the ear, with the juice of an onion, cures the moft inveterate deafnefs. Others affirm, that a falivation will fometimes perform a cure. A critical deafnefs will ceafe of itfelf. Etmuller recommends amber and mufk; and hardnefs of hearing has been often cured by putting a grain or two of mufk into the ear with cotton.

Hoffman fays, deafnefs fometimes arifes from a flacknefs of the auditory nerves, which often happens from too great a humidity, which, if neglected, will terminate in a perpetual and incurable deafnefs, and may be difperfed, if taken in time, by proper cephalics and fudorifics. Some, for this purpofe, recommend equal parts of fpirit of lavender and hungary-water, which fhould be dropt warm into the ear. Lindanus advifes the gall of an eel, mixt with fpirit of wine; and others, the fumes of fulphur conveyed into the ear with a pipe or funnel: but regard muft always be had to the caufe, if difcoverable.

Heister informs us, that medicinal waters drank in the summer time pretty largely, are the best means as preservatives, and for curing disorders of the ears; and that they often perform more than any other remedies whatever.

Those born deaf are also dumb, as not being able to learn any language, at least in the common way: however, as the eyes, in some measure, serve them for ears, they may sometimes understand what is said, by observing the motion of the lips, tongue, &c. of the speaker.

DEAL, a thin kind of fir-planks, of great use in carpentry: they are formed by sawing the trunk of a tree into a great many longitudinal divisions, of more or less thickness, according to the purposes they are intended to serve.

Deals are rendered much harder, by throwing them into salt-water as soon as they are sawed, keeping them there three or four days, and afterwards drying them in the air or sun; but neither this nor any other method yet known, will preserve them from shrinking.

Deals called Burgendorp deals, the hundred containing six score, pay on importation 3 l. 8 s. $8\frac{40}{100}$d. and draw back 3 l. 3 s. the rate 12 l. Meabro deals, six score, pay 1 l. 2 s. $10\frac{80}{100}$d. and draw back 1 l. 1 s. the rate 4 l. Norway deals, six score, pay 1 l. 8 s. $7\frac{1}{2}$d. and draw back 1 l. 6 s. 3 d. the rate 5 l. Spruce deals, six score, pay 4 l. 5 s. $10\frac{1}{2}$d. and draw back 3 l. 18 s. 9 d. the rate 15 l. Deals from Russia, and all other countries not particularly rated, exceeding twenty feet in length, pay 4 l. 5 s. $10\frac{50}{100}$d. and draw back 3 l. 18 s. 9 d. the rate 15 l. Deals from Sweden, or any other country, of twenty feet in length or under, not otherwise rated, the 120, pay 1 l. 8 s. $7\frac{1}{2}$d. and draw back 1 l. 6 s. 3 d. the rate 5 l.

DEAL, in geography, a port town of the county of Kent, between which and the Goodwin-sands, the shipping usually rides in the Downs, in going out or coming home: it is about sixty-seven miles eastward of London: east long. 1° 30′, and north lat. 51° 16′.

DEAN, an ecclesiastical dignitary in cathedral and collegiate churches, and head of the chapter.

As there are two foundations of cathedral churches in England, the old and the new, so there are two ways of creating deans. Those of the old foundation, founded before the suppression of monasteries, as the deans of St. Paul's, York, &c. are raised to that dignity much after the manner of bishops, the king first sending his congé d'elire, the chapter electing, and the king granting his royal assent, the bishop confirms him, and gives his mandate to install him. Those of the new foundation, whose deanries were raised upon the ruins of priories and convents, such as the deans of Canterbury, Durham, Ely, Norwich, Winchester, &c. are donative, and installed by virtue of the king's letters patent, without either election or confirmation. Canonists distinguish between deans of cathedral and those of collegiate churches. The first, with their chapter, are regularly subject to the jurisdiction of the bishop. As to the latter, they have usually the contentious jurisdiction in themselves, though sometimes this belongs to them in common with the chapter. There are cathedral churches which never had a dean, and in which the bishop is head of the chapter, and in his absence, the archdeacon: such are the cathedrals of St. David and Landaff. There are also deans without a chapter, as the dean of Battle in Sussex, dean of the arches, &c. and deans without a jurisdiction, as the dean of the chapel royal. In this sense the word is applied to the chief of certain peculiar churches or chapels.

Rural DEAN, called also archpresbyter, originally exercised jurisdiction over ten churches in the country, and afterwards became only the bishop's substitute, to grant letters of administration, probate of wills, &c. to convocate the clergy, and signify to them sometimes by letters, the bishop's will, and to give induction for the archdeacon. Their office is now lost in that of the archdeacons and chancellors.

DEAN *of a monastery*, was a superior established under the abbot, to ease him in taking care of ten monks, whence he was called decanus.

DEAN and CHAPTER, are the bishop's council to assist him in the affairs of religion, and to assent to every grant which the bishop shall make to bind his successors. As a deanry is a spiritual dignity, a man cannot be a dean and prebendary of the same church.

DEAN, in geography, the name of a forest in Gloucestershire, lying northward of the river Severn.

DEAR-

DEARTICULATION, the fame with diarthrofis. See DIARTHROSIS.

DEATH, *mors*, is generally confidered as the feparation of the foul from the body; in which fenfe it ftands oppofed to life, which confifts in the union thereof. Phyficians teach, that as the life of thofe animals we call perfect confifts in a continued flux and reflux of the blood, nervous juice and air, to and from the principal organs, fo a man may be reckoned dead when he no longer breathes, and his heart and arteries have left off all circulation and pulfation. But Dr. Stevenfon, as we find in the Medical Effays, does not admit this doctrine, being of opinion, that after the motion of the heart, arteries, and lungs ceafes, there often remains a fmall degree of vital principle deferving attention. He then propofes a theory of his own, in confequence of which it feems, that death does not inevitably attend an intire organic reft of what we call the folids of the body; nay, that one cannot be called dead, till the energy of the blood is fo far gone, that, though affifted by all poffible means, it can never be again able to fill and ftimulate into contraction the right finus venofus, and auricle of the heart.

Men, fays lord Bacon, fear death as children fear the dark; and as that natural fear in children is increafed by frightful tales, fo is the other. Groans, convulfions, weeping friends and the like, fhew death terrible; yet there is no paffion fo weak but conquers the fear of it, and therefore death is not fuch a terrible enemy. Revenge triumphs over death, love flights it, honour afpires to it, dread of fhame prefers it, grief flies to it, and fear anticipates it. The fame noble author thinks it the office of a phyfician to procure eafy deaths, as well as to reftore health.

In law, there is a natural death and a civil death: natural, where nature itfelf expires; civil, where a perfon is not actually dead, but adjudged fo by law. Thus, if any perfon, for whofe life an eftate is granted, remains beyond fea, or is otherwife abfent feven years, and no proof made of his being living, he fhall be accounted naturally dead.

DEATH-WATCH, in zoology, an infect nearly of the fize of the common loufe, frequent among old wood, furniture, &c. It is of an oblong and flattifh figure, and of a pale brownifh-white colour; and the noife, refembling the beating of a watch, is the love-note of thefe animals, when the male or female woo each other.

DE BENE ESSE', a latin phrafe ufed in our law in a doubtful meaning, as to take or do a thing *de bene effe*, is to allow it at prefent to be well done; but when it comes to be more fully examined, then to ftand or fall according to the merit of the thing. In the chancery, upon a motion for one of the defendants of a fuit to be examined, the court frequently orders it to be done *de bene effe*, viz. that his depofition fhall be taken, and allowed or fuppreffed at the hearing of the caufe upon the full debate of the matter as the court fhall think fit. Alfo where a complainant's witneffes are fick or aged, or going beyond fea, fo that he is in danger of lofing their evidence, the court of chancery will order them to be examined *de bene effe*, in which cafe they are valid, if the plaintiff has not an opportunity of examining them afterwards.

DEBENHAM, a market town of Suffolk, about twenty miles eaft of Bury: eaft longitude 1° 20′, and north latitude 52° 20′.

DEBENTURE, a term of trade ufed at the cuftom-houfe for a kind of certificate figned by the officers of the cuftoms, which entitles a merchant exporting goods to the receipt of a bounty or drawback. All merchandifes that are defigned to be taken on board for that voyage being entered and fhipped, and the fhip being regularly cleared out, and failed out of port on her intended voyage, debentures may be made out from the exporter's entries, in order to obtain the drawbacks, allowances, bounties or premiums; which debentures for foreign goods, are to be paid within one month after demand. And in making out thefe debentures, it muft be obferved, that every piece of vellum, parchment, or paper, containing any debenture for drawing back cuftoms or duties, muft, before writing, be ftamped, and pay a duty of eight-pence.

The form of debentures vary, according to the merchandife exported. In the execution of debentures for tobacco, it muft be particularly obferved, 1. That debentures for the fame quantity, may be made in one or more parchments. 2. That the exporter's oath muft be printed, fpecifying whether he acts for himfelf or by commiffion. If exported to any other foreign ports than thofe of Ireland, the word Ireland muft be added to the oath after Great Britain. 4. That as no tobacco

may be consumed on board ships of war in Europe, but what has paid full duties, and been manufactured in Great Britain, no drawback is to be allowed for tobacco exported in any man of war. 5. That the eight pounds *per* hogshead of 350 pounds, or more, allowed for draught at importation, must not be deducted on exportation. 6. That debentures for tobacco exported to Ireland, must not be paid till a certificate be produced, testifying the landing thereof. 7. That no persons may swear to the exportation, but such as are permitted to swear to debentures for other goods. In debentures for all other foreign goods, no person may be admitted to swear to the exportation, but the true exporter, either as a proprietor, or, who being employed by commission, is concerned in the direction of the voyage. All kinds of debentures before delivered or paid to the exporters, are entered into a separate book kept for that purpose by the collector and comptroller of the customs. See the article BOUNTY.

DEBENTURE, in some of the acts of parliament, denotes a kind of bond or bill first given in 1649, whereby the government is charged to pay the soldier creditor, or his assigns, the money due on auditing the account of his arrears.

DEBENTURE is likewise used in the exchequer, and given to the king's servants for the payment of their wages.

DEBET, among merchants, signifies the sums due to them for goods sold on credit, for which they have charged their journal or ledger. It is more particularly understood of the remainder of debts, part of which has been paid on account.

DEBET, among book-keepers, is used to express the left hand page of the ledger, to which are carried all articles supplied or paid, on the subject of an account.

DEBET and SOLET, in law, are formal words used in divers writs, sometimes both together, and sometimes only debet. As if a person by writ sues to recover any right whereof his ancestor was disseized, then he uses the word debet alone: but where he sues for any thing that is now first of all denied him, in that case he uses debet and solet.

DEBET & DETINET, *he owes and detains*, in law, are terms used in bringing of actions. Debt against an heir, must be in the debet and detinet; but against executors, for money due in the time of the testator, the action ought to be in the detinet.

DEBILITY, among physicians, a relaxation of the solids, occasioning oftentimes weaknesses and faintings.

DEBRECHEN, a town of upper Hungary, about seventy-seven miles east of Buda; east longitude, 21° 10′, and north latitude 47° 45′.

DEBRUIZED, in heraldry, a term peculiar to the English, by which is intimated the grievous restraint of any animal, debarred of its natural freedom, by any of the ordinaries being laid over it.

DEBT, *debitum*, in law, any thing due to another, whether it be money, goods, or services; or, the action brought for recovering the same.

Where money is due upon any speciality, an action of debt, and no other, lies. On a bond, debt may be brought against the obligor or his heir, who has lands by descent, if the executors have not sufficient to pay it; and an heir mediate may be sued for debt, as if he were an immediate heir. If a person acknowledges, by deed, that he has so much of another's money in his hands, here the action of debt will lie for it; and where one owes a sum of money to another, who hath his note under hand, without a seal, action of debt on a mutuatus lies. Debt lies also on a recognizance; so upon a statute merchant, which is in nature of a bond, or obligation: but it is said to be otherwise, in case of a statute staple.

Whether an action of debt be brought on a bill, bond, lease, *&c.* the several writings are to be well considered, by which the plaintiff warrants his action, and the sum due must be rightly set forth: thus, if it be for rent, the time of commencement and ending must be specified; and the judgment, where the demand is in the debet and detinet, is to recover the debt, damages, and costs of suit. But in a debt on a single bill, a defendant may plead payment, before the action brought in bar; and, on bond, he may bring in the principal, interest, and costs pending the action, and thereupon be discharged.

DEBT *to the king*, comprehends in it all rents, issues, amerciaments, and other things due to the king, whose debts are preferred before those of a subject; and until his debt is satisfied, he may protect the debtor from the arrests of others. Pledges shall not be distrained for these debts, where the principal is sufficient.

DEBTOR,

DEBTOR, a perſon who owes any thing to another, in contradiſtinction to creditor, which is he to whom the debt is owing.

Where debt is a ſimple contract, it follows the perſon of the debtor, and, it is ſaid, not of the creditor, as to actions brought, &c.

There have been divers ſtatutes diſcharging debtors out of priſon, when they had no effects to pay their creditors. See the article PRISONER.

DEBTOR, in merchants accounts. See the article BOOK-KEEPING.

DECACHORDON, in antiquity, a muſical inſtrument with ten ſtrings, called by the Hebrews haſur, being almoſt the ſame as our harp, of a triangular figure, with an hollow belly, and ſounding from the lower part.

DECAGON, in geometry, a plane figure with ten ſides and ten angles: it is called a regular decagon, when all the ſides and angles are equal.

If we ſuppoſe the radius of a circle to be r, then will $\sqrt{\frac{5}{4}r^2} - \frac{1}{2}r$, or $\sqrt{\frac{5-1}{2}} + r$, be the ſide of a decagon inſcribed in that circle. Again, ſuppoſing the ſide of a decagon to be 1, the area thereof will be 8.69; whence as 1 to 8.69, ſo is the ſquare of the ſide of any given decagon to the area of that decagon.

DECALOGUE, δεκαλογος, the ten precepts or commandments delivered by God to Moſes, after engraving them on two tables of ſtone.

There are ſeveral refined ſpeculations concerning the promulgation of thoſe divine laws, as whether they were delivered by an angel, deputed by God for that purpoſe, or by the deity himſelf; and, if by the latter, whether it was the firſt or ſecond perſon of the godhead that took upon him to be the legiſlator of the Jews: but theſe are debates of ſuch a nature, that nothing can be concluded about them. The Jews, by way of excellence, call theſe commandments the *ten words*, from whence they had afterwards the name of decalogue: but it is to be obſerved, that they joined the firſt and ſecond into one, and divided the laſt into two: they underſtand that againſt ſtealing, to relate to the ſtealing of men, or kidnapping; alleging, that the ſtealing one anothers goods or property, is forbidden in the laſt commandment.

The Talmudiſts, and after them Poſtellus, pretended that the decalogue was written, or engraved, in letters of light, *i. e.* luminous, ſhining letters, and that the engraving went quite thro' the tables.

The emperor Julian objected to the decalogue, that the precepts it contained (thoſe only excepted which concern the worſhip of falſe gods, and the obſervation of the ſabbath) were already ſo familiar to all nations, and ſo univerſally received, that they were unworthy, for that very reaſon, to be delivered, by ſo great a legiſlator, to ſo peculiar a people. The church of Rome has ſtruck the ſecond commandment quite out of the decalogue, and to make their number complete, hath ſplit the tenth into two. The reaſon of which may be eaſily conceived.

DECAMERIS, a term uſed by ſome writers upon ſound, to denote a tenth part. See the article SOUND.

DECAMERON, a work containing the actions or converſations of ten days. Boccacio's Decameron conſiſts of one hundred novels, related in ten days.

DECAMPING, in military affairs, is the marching of an army from the ground where it before lay encamped. See CAMP.

DECAN, a province of the hither India, bounded by the province of Cambaya, or Guzurat, on the north; by Golconda and Berar, on the eaſt; by Viſapour, on the ſouth; and by the Indian ocean on the weſt. Its chief inland town is Aurengabad, and upon the coaſt the town of Bombay.

DECANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the great characteriſtic of which is, that they have hermaphrodite flowers, with ten ſtamina in each. See BOTANY, STAMINA, &c.

DECANTATION, among chemiſts, &c. the gently pouring off a liquor from its fæces, by inclining the lip or canthus of the veſſel; whence the name.

The deſign of this operation, is in order to have the liquor free from the ſediment, which, upon ſtanding, it lets fall to the bottom of the veſſel.

DECANUS, in roman antiquity, an officer who preſided over ten other officers, and was head of the contubernium, or ſerjeant of a file of ſoldiers.

DECAPITE', or DEFFAIT, in heraldry, See the article DEFFAIT.

DECAPROTI, *decemprimi*, in roman antiquity, officers for gathering the tributes and taxes.

The decaproti were alſo obliged to pay for the dead, or to anſwer to the emperor

ror for the quota parts of ſuch as died, out of their own eſtates.

DECASTYLE, in the antient architecture, a building with an ordonnance of ten columns in front, as the temple of Jupiter Olympius was.

DECEIT, *dolus*, in law, a ſubtile trick, or device, to which may be added all manner of craft and colluſion, or underhand practice, uſed to defraud another, by any means whatever.

Deceit is an offence both by common law and by ſtatute. All practices of defrauding, or endeavouring to defraud, another of his right, are puniſhable by fine and impriſonment, and ſometimes pillory, *&c.* and there is a writ called *deceptione*, that lies for one who receives injury or damage, *&c.*

A writ of deceit lies againſt attornies, for loſſes ſuſtained by their default; alſo againſt bakers, brewers, and other artificers, for not ſelling good commodities, or refuſing to perform a bargain: in all which caſes, they are, by ſtatute, liable to penalties in proportion to their offence.

DECEIVED, in the manege; a horſe is ſaid to be deceived, upon a demivault of one or two treads, when working, for inſtance, to the right, and not having yet finiſhed above half the demivault, he is preſſed one time or motion forwards, with the inner leg, and then is put to a reprize upon the left, in the ſame cadence with which he began; and thus he regains the place where the demivault had been begun to the right, and works to the left: thus a horſe may be deceived upon any hand.

DECEMBER, in chronology, the laſt month of the year, conſiſting of thirty-one days, and ſo called as being the tenth month in the roman year, which commenced with March. See the articles YEAR and MONTH.

DECEMPEDA, δεκάπους, in antiquity, a rule or rod divided into ten feet, each of which was ſubdivided into inches, and thoſe into digits, uſed in meaſuring of land, and, by architects, in giving the proper dimenſions and proportions to the parts of their buildings.

DECEM TALES, in law, a writ that iſſues directed to the ſheriff, whereby he is commanded to make a ſupply of jurymen, where a full jury does not appear on a trial at bar.

DECEMVIRI, in roman antiquity, ten magiſtrates choſen annually at Rome, to govern the commonwealth inſtead of conſuls, with an abſolute power to draw up and make laws for the people.

One of the decemviri had all the enſigns and honours of the function, and the reſt had the like in their turn, during the year of their decemvirate. In them was veſted all the legiſlative authority ever enjoyed by the kings, or, after them, by the conſuls. It was the decemviri drew up the laws of the Twelve Tables, thence called *leges decemvirales*, which were the whole of the roman law, for a conſiderable time.

There were alſo other decemviri, created on frequent emergencies, to manage and regulate certain affairs, as conducting colonies, preſiding at feaſts, taking care of ſacrifices, keeping the ſibyls books, *&c.*

DECENNALIA, antient roman feſtivals celebrated by the emperors, every tenth year of their reign, with ſacrifices, games, and largeſſes for the people. The emperor Auguſtus firſt inſtituted theſe ſolemnities, in which he was imitated by his ſucceſſors: at the ſame time the people offered up vows for the emperor, and for the perpetuity of the empire, which were therefore called *vota decennalia.* Auguſtus's view in eſtabliſhing the decennalia was to preſerve the empire and the ſovereign power without offence or reſtraint to the people.

DECENNARY, in our old law-books, denotes the precinct or diſtrict of ten friburghs. See the next article.

DECENNIERS, DECINERS, or DOZINERS, in our antient law, ſuch as had the overſight of ten friburghs, for the maintenance of the king's peace, the limits of whoſe juriſdiction was called decenna.

Theſe ſeem to have had a great authority in the time of the Saxons, taking cognizance of cauſes within their circuits, and redreſſing wrongs, by way of judgment. In later times, the word came to ſignify ſuch a perſon as by oath of loyalty to his prince, was ſettled in the combination or ſociety of ſuch a dozein.

DECEPTIONE, in law, a writ which lies in caſes of deceit. See DECEIT.

DECIDUOUS, an appellation chiefly uſed in reſpect to plants: thus, the calyx or cup of a flower is ſaid to be deciduous, when it falls along with the flower-petals; and, on the contrary, it is called permanent, when it remains after they are fallen. Again, deciduous leaves are thoſe which fall

fall in autumn, in contradiſtinction to thoſe of the ever-greens, which remain all the winter.

DECIES TANTUM, in law, a writ that lies againſt a juror, for having taken money of either party in a ſuit, on account of giving his verdict.

This writ is ſo called becauſe it recovers ten times as much as he took. Any perſon, though not a party in the ſuit, may bring this writ in the name of the king and himſelf, and recover the like; one half to the crown, and the other to the informer or proſecutor, which action the king may not releaſe by pardon, after it is commenced.

DECIL, in aſtronomy, an aſpect or poſition of two planets, when they are diſtant from each other a tenth part of the zodiac.

DECIMAL ARITHMETIC, the art of computing by decimal fractions.

DECIMAL FRACTION, that whoſe denominator is always 1, with one or more cyphers: thus, an unit may be imagined to be equally divided into 10 parts, and each of theſe into 10 more; ſo that by a continual decimal ſubdiviſion the unit may be ſuppoſed to be divided into 10, 100, 1000, &c. equal parts, called tenth, hundredth, thouſandth parts of an unit.

In decimal fractions, the figures of the numerator are only expreſſed, the denominator being omitted, becauſe it is known to be always an unit with ſo many cyphers as there are places in the numerator. A decimal fraction is diſtinguiſhed from an integer with a point prefixed, as .2 for $\frac{2}{10}$, .34 for $\frac{34}{100}$, .567 for $\frac{567}{1000}$, &c. The ſame is obſerved in mixed numbers, as 678.9 for $678\frac{9}{10}$, 67.89 for $67\frac{89}{100}$, 6.789 for $6\frac{789}{1000}$, &c.

Cyphers at the right hand of a decimal fraction alter not its value; for .5 or .50 or .5000 is each of them of the ſame value, equal to $\frac{5}{10}$, or $\frac{1}{2}$: but cyphers at the left hand, in a decimal fraction, decreaſe the value in a tenfold proportion; for .05 is $\frac{5}{100}$, .005 is $\frac{5}{1000}$, .0005 is $\frac{5}{10000}$, &c.

Decimal fractions are eaſily reduced into a common denominator, by making, or even ſuppoſing, all of them to conſiſt of the ſame number of places; ſo .3, .45, .067, .0089, may be written thus, .3000 .4500, .0670, .0089; all which conſiſting of four places, their common denominator is an unit with four cyphers, namely 10000.

Addition and ſubtraction of decimals are the ſame as in whole numbers, when the places of the ſame denomination are ſet under one another, as in the following examples:

To	34.25	From	16.5
Add	3.026	Subtract	.125
Sum	37.276	Rem.	16.375

In multiplication the work is the ſame as in whole numbers, only in the product, ſeparate, with a point, ſo many figures to the right hand as there are fractional places both in the multiplicand and multiplier; then all the figures on the left hand of the point make the whole number, and thoſe on the right a decimal fraction. It is to be noted, that if there be not ſo many figures in the product, as ought to be ſeparated by the preceding rule, then place cyphers at the left, to complete the number, as may be ſeen in Example V.

Ex. I. Mult.	456	Ex. II. Mult.	45.6
by	21.3	by	21.3
	1368	Product	971.28
	456		
	912		
Product	9712.8		

Examp. III. Multiply	456
by	0.213
Product	97.128
Example IV. Multiply	45.6
by	0.213
Product	9.7128
Ex. V. Multiply	0.0456
by	0.213
Product	0.0097128

In diviſion the work is the ſame as in whole numbers, only in the quotient, ſeparate, with a point, ſo many figures to the right hand for a decimal fraction, as there are fractional places in the dividend, more than in the diviſor, becauſe there muſt be ſo many fractional places in the diviſor and quotient together, as there are in the dividend.

As diviſion of decimal fractions is extremely difficult, eſpecially with regard to the value of the figures of the quotient, we ſhall here give a general rule for aſcertaining their values, *viz.*

Rule, place the firſt multiple of the diviſor under the dividend, as in operations of common diviſion; then will the unit's place of this multiple ſtand under ſuch a place of the dividend, as the firſt ſignificant figure of the quotient is to be; that is, the firſt ſignificant figure of the quotient will be of the ſame name, or value, with the figure of the dividend which ſtands above the unit's place of the multiple.

This

This rule will hold in all cafes. 1. When the number of decimals are equal in the divifor and dividend, the quotient will be integers, or whole numbers: for placing the firft multiple of the divifor under the dividend, according to the rule, (Exam. I.) the unit's place 5, is found to ftand under 9, the place of tens in the dividend; fo that 3, the firft figure of the quotient, muft be tens alfo, and 5, the next figure, units.

Example I.

8.45)295.75(35
25.35
4225
4225

2. When the number of decimals in the dividend, exceed thofe in the divifor, as in Example II. where 2, the unit's place of the multiple of the divifor, ftands under 8, the place of tens of the dividend; whence 3, the firft figure of the quotient, muft be tens alfo; and 2, the next figure, units; fo that the remaining figures, 12, muft be decimals. This is done, more fhortly, by making as many figures of the quotient decimals, as there are more decimal places in the dividend than in the divifor.

Example II.

24.3)780.516(32.12
72.9

3. When there are not fo many decimal places in the dividend, as there are in the divifor, cyphers muft be added to the right hand of the dividend, to make them equal: thus, to divide 192.1 by 7.684, as in Example III. add two cyphers, to make the decimals equal; and, by the above rule, the quotient 25 will be found to be integers, as 5, the place of units, ftands under 9, the place of tens.

Example III.

7.684)192.100(25
15.368
38420
38420

4. If after divifion there are not fo many figures in the quotient as there ought to be decimal parts, fupply this defect by prefixing cyphers to the quotient found: thus, in Example IV. the quotient by divifion is found to be 758; and, by the above rule, the firft figure, 7, ought to ftand in the decimal place of thoufandths, which it is made to do by prefixing two cyphers.

Example IV.

957)7.25406(.00758
6699

Vulgar fractions are reduced to decimals of the fame value, by dividing the numerator by the denominator.

Thus, $\frac{1}{2}=\frac{1.0}{2}=.5$, and $\frac{3}{4}=\frac{3.00}{4}=.75$, and $\frac{2}{7}=\frac{2.000000, \&c.}{7}=.285714$, nearly.

Decimal scales are thofe which are decimally divided.

DECIMATION, a punifhment inflicted by the Romans on fuch foldiers as quitted their poft, or behaved themfelves cowardly in the field. The names of all the guilty were put into an urn or helmet, and as many were drawn out as made the tenth part of the whole number, and thefe were put to the fword, and the others faved.

DECIPHERING, the art of finding the alphabet of a cipher. See Cipher. Every language has, befides the form of its characters, fomething peculiar in the place, order, combination, frequency, and number of the letters; to all which particular regard is to be had in deciphering. In all languages, however, the following rules ought to be obferved: 1. One word is to be compared with another, that their refemblance and difference may be known. 2. No word can be without a vowel. 3. A word of one letter is always a vowel, or a confonant with an apoftrophe. 4. The vowels recur much more frequently than the confonants. 5. Double vowels may be at the beginning of a word, but not double confonants. 6. Double characters at the beginning of a word are always vowels. 7. Short words of two or three letters have two or three, or one or two confonants. 8. The vowels are therefore moft eafily learned from the fhort words which are to be firft confidered by the decipherer. 9. If double characters are preceded by a fingle letter, the letter is a vowel. 10. In languages abounding with diphthongs one vowel is often joined with another. 11. The letter that precedes or follows double confonants, is, if a confonant, always one of the liquids, *l*, *m*, *n*, *r*. 12. If two different characters occur, of which the latter is often conjoined with various letters, and the former is never found either by itfelf, or followed by any other letter, thofe two are *qu*. 13. Thefe letters *qu* are always followed by a vowel. 14. One vowel recurs more frequently than another, as do the confonants, according to the language, *&c.*

DECISE, a town of the Orleanois, in France, fituated on the river Loire, about fifteen miles fouth-eaft of Nevers: eaft long. 3° 32′, and north lat. 46° 40′.

DECK *of a fhip* is a planked floor from ftem to ftern, upon which the guns lie, and

and where the men walk to and fro.

Great ſhips have three decks, firſt, ſecond, and third, beginning to count from the lowermoſt.

Half deck reaches from the main-maſt to the ſtem of the ſhip.

Quarter-deck is that aloft the ſteerage, reaching to the round-houſe.

Fluſh-deck is that which lies even in a right line fore and aft, from ſtem to ſtern.

A rope-deck is that made of cordages, interwoven and ſtretched over a veſſel, thro' which it is eaſy to annoy an enemy, who comes to board her. They are little uſed but by ſmall veſſels, to defend them from privateers.

DECKENDORF, a town of Bavaria, in Germany, ſituated on the Danube, about thirty-ſeven miles ſouth-eaſt of Ratiſbon: eaſt longitude 13°, and north latitude 48° 45'.

DECLAMATION, a ſpeech made in public, in the tone and manner of an oration, uniting the expreſſion of action to the propriety of pronunciation, in order to give the ſentiment its full impreſſion upon the mind.

Among the Greeks, declamation was the art of ſpeaking indifferently on all ſubjects, and on all ſides of a queſtion. With us it is reſtrained to certain exerciſes which ſcholars perform, to teach them to ſpeak in public.

DECLARATION, in law, is a formal ſhewing in writing the ground of complaint of the plaintiff, in an action againſt the defendant, where the plaintiff is ſuppoſed to have received ſome injury. This declaration ought to be plain and certain, becauſe it impeaches the defendant and obliges him to anſwer thereto. It is alſo an expoſition of the writ, with the addition of time, circumſtances, &c. and muſt be true as well as clear, for the court will not take things in it by implication: and it ſets forth the names both of the plaintiff and defendant, the nature and cauſe of the action, &c. and the damage received.

Declaration, in an action real, is termed a count. See the article COUNT.

DECLARATION is alſo uſed for a confeſſion which the quakers are obliged to make and ſubſcribe, inſtead of the oaths of ſupremacy, &c. See AFFIRMATION.

DECLARATION, a term of the cuſtom-houſe, and of commerce in France, contains a particular account or invoice of what is contained in the bales, &c. brought to the offices for entrance inward or outward.

DECLENSION, in grammar, an inflexion of nouns according to their divers caſes, as nominative, genitive, dative, &c. It is a different thing in the modern languages, which have not properly any caſes, from what it is in the antient greek and latin. With reſpect to languages, where the nouns admit of changes, either in the beginning, the middle, or ending, declenſion is properly the expreſſion of all thoſe changes in a certain order, and by certain degrees called caſes. With regard to languages, where the nouns do not admit of changes in the ſame number, declenſion is the expreſſion of the different ſtates a noun is in, and the different relations it has; which difference of relations is marked by particles, and called articles, as *a*, *the*, *of*, *to*, *from*, *by*, &c. See ARTICLE.

DECLENSION of a diſeaſe is when it is paſt its height.

DECLINATION, in aſtronomy, the diſtance of any celeſtial object from the equinoctial, either northward or ſouthward. It is either true or apparent, according as the real or apparent place of the object is conſidered.

The declination being an arch of a ſecondary of the equinoctial intercepted between a given point and the equinoctial, and perpendicular to the ſame, the declination of a ſtar, &c. is found in the following manner. Firſt obſerve the altitude of the pole; as P R (plate LXVII. fig. 6.) this ſubtracted from 90°, gives the height of the equator A H; then the meridian altitude of the ſtar H D being obſerved, if it be greater than the altitude of the equator A H, the latter ſubtracted from the former, leaves the declination northward A D: or if the altitude of the ſtar H T be leſs than that of the equator A H, the former ſubtracted from the latter, leaves the declination ſouthward T A. If the ſtar be in the quadrant Z R, then the leaſt altitude M R, ſubtracted from the altitude of the pole P R, leaves the diſtance from the pole P M; which ſubtracted again from the quadrant P Q, leaves the declination M Q.

By this method are conſtructed the tables of declination of the fixed ſtars, given us by Ricciolus and Dechales.

To find the ſun's or ſtar's declination by the globe, bring the ſun's place, or the ſtar,

ſtar, to the meridian, and the degrees from the equinoctial there reckoned, either north or ſouth, are the declination at noon.

The greateſt declination of the ſun, or of the ecliptic, is commonly computed 23° 30′. See ECLIPTIC.

Circle of DECLINATION. See the article CIRCLE.

Refraction of the DECLINATION. See the article REFRACTION.

DECLINATION *of the ſea-compaſs*, or *needle*, is its variation from the true meridian of any place. See VARIATION.

DECLINATION *of a wall or plane for dials* is an arch of the horizon, contained either between the plane and the prime vertical circle, if you reckon it from the eaſt or weſt; or elſe between the meridian and the plane, if you account it from north or ſouth. There are many ways given by authors for finding the declination of a plane, of which all thoſe that depend upon the magnetic needle deſerve to be ſuſpected on many accounts. The common method, by finding the ſun's horizontal diſtance from the pole of the plane, is ſubject to many errors and difficulties. The way therefore we would recommend as the beſt for finding the declination of a plane, is by a declinator. See the next article.

DECLINATOR, or DECLINATORY, an inſtrument contrived for taking the declinations, inclinations, and reclinations of planes. It is conſtructed in the following manner: on a ſquare wooden board, A B C D (plate LXVII. fig. 7. n° 1.) deſcribe a ſemicircle A E D, and divide the two quadrants A E and E D into 90°, each beginning from E, as in the figure: then having fixed a pin in the center F, fit a ruler H I upon the ſame, moveable thereon, with a box and needle K (*ibid.* n° 2.) In order to take the declination of a plane, apply the ſide A D to the plane propoſed, as M N (*ibid.* n° 3.) and move the ruler F G, with the compaſs G, about the center F, till the needle reſt upon the line of the magnetical meridian of the place: if the ruler cut the quadrant in E, the plane is either directly northern or ſouthern; but if it cut between D and E, the plane declines to the weſt; and if between A and E, to the eaſt, by the quantity of the angle G F E.

Would you take the inclinations and reclinations of planes with this inſtrument, inſtead of the ruler and needle, a thread with a plummet is fitted on a pin in the center F; then the ſide B C of the declinator A B C D (*ibid.* n° 4.) being applied to the propoſed plane, as I L, if the plum-line F G cut the ſemicircle A E D in the point E, the plane is horizontal; or if it cut the quadrant E D, in any point at G, then will E F G be the angle of inclination: laſtly, if applying the ſide A B to the plane, the plummet cut E, the plane is vertical. Hence if the quantity of the angle of inclination be compared with the elevation of the pole and equator, it is eaſily known whether the plane be inclined or reclined. See INCLINATION and RECLINATION.

DECLINING DIALS, thoſe which do not face directly any of the four cardinal points. See the article DIAL.

DECLIVIS, in anatomy, a muſcle otherwiſe called obliquus deſcendens. See the article OBLIQUUS.

DECLIVITY denotes juſt the reverſe of acclivity. See ACCLIVITY.

DECOCTION, in pharmacy, the boiling ſimples, or other drugs, in order to extract their virtues for ſome medicinal purpoſe. The general ſubjects of decoction are animals and vegetables, and ſometimes minerals, as antimony and quickſilver. The liquors which ſerve to boil them, are water, wine, vinegar, milk, and whey.

Decoction is moſtly employed about balſamics, detergents, and cathartics; for it is not ſo proper for cephalics, *&c.* becauſe it exhales the more volatile parts, in which the virtues of all thoſe ingredients conſiſt. The harder bodies, as woods, dried roots, *&c.* require moſt boiling; but herbs and ſeeds need only be ſcalded. All thoſe decoctions which are reſtringent, and moſt of the cathartics, may, for greater elegance, be clarified; but all ſuch as are emollient, and intended to conſiſt of the ſoft and mucilaginous parts of ſimples, are by no means to be ſo managed.

DECOLLATION, beheading, a term frequently uſed in the phraſe, *decollation of St. John Baptiſt*, which denotes a painting repreſenting the Baptiſt's head ſtruck off from the body.

DECOMPOSITE LEAF, one whoſe petiole is twice divided before it gives riſe to the leaf.

DECOMPOSITION, in chemiſtry and pharmacy, the reduction of a body into its principles or component parts. See the article ANALYSIS.

DECORATION, in architecture, is used for whatever adorns a building, either withoutside or within. The orders of architecture contribute a great deal to the decoration; but then the several parts of those orders must have their just proportion, characters and ornaments, otherwise the finest order will bring confusion rather than richness. See CORINTHIAN, COMPOSITE, &c. ORDERS.

Decorations, in churches, are paintings, festoons, vases, &c. occasionally applied to the walls, but with such discretion as not to destroy the form and beauty of the architecture, as is practised in Italy at the solemn feasts. See the article FESTOON, VASE, &c.

DECORATION also signifies the scenes of theatres. See the article SCENE.

In operas and other theatrical performances, they must be often changed, in conformity to the subject.

DECORTICATION, the same with barking of trees. See BARKING.

DECORUM, in architecture, is the suitableness of a building, and the several parts and ornaments thereof, to the station and occasion.

Vitruvius is very exact in this point, and gives rules expressly for the appropriating the several orders to their natural characters.

Decorum is used by some to signify the observing a due respect between the inhabitant and habitation. Whence Palladio concludes that the principal entrance must never be regulated by any certain dimensions, but according to the dignity of the person who is to live in it.

DECOUPLE', in heraldry, the same as uncoupled: thus, a chevron decouplé, is a chevron wanting so much of it towards the point, that the two ends stand at a distance from one another, being parted and uncoupled.

DECOURS, in heraldry, the same with decrement. See DECREMENT.

DECOY, a place made for catching wild-fowl. Hence,

DECOY-DUCK is a duck that flies abroad, and lights into company of wild ones, which by her allurements she draws into the decoy.

DECREE, an order made by a superior power, for the regulation of an inferior.

DECREE, in the civil law, is a determination that the emperor pronounces upon hearing a particular cause between plaintiff and defendant.

DECREES *of councils* are the laws made by them, to regulate the doctrine and policy of the church.

DECREES *in chancery*, are the determinations of the lord chancellor, upon a full hearing of the merits of a cause.

DECREET, in the law of Scotland, a final decree or judgment of the lords of session, from which an appeal only lies to parliament, where we find them but too often reversed; a circumstance surely not much to the honour of the august bench, from whence the appeal lies.

DECREMENT, in heraldry, signifies the wane of the moon from the full to the new. See the article MOON.

The moon in this state is called moon decressant, or in decours; and when borne in coat-armour, faces to the left side of the escutcheon, as she does to the right side when in the increment. See the article CRESCENT.

DECREPITATION, in chemistry, the act of calcining salt over the fire, till it cease to crackle. The design of this is to free the salt from superfluous moisture: but as it is thereby rendered porous, and apt to imbibe the humidity of the air, it must always be kept very close afterwards, lest the air should moisten it anew.

This term is also applied to the crackling of the salts during the operation.

DECRETAL, in the canon-law, a letter of a pope, determining some point or question in the ecclesiastical law. The decretals compose the second part of the canon-law. The first genuine one acknowledged by all the learned as such, is a letter of pope Siricius, written in the year 385, to Himerus bishop of Tarragona, in Spain, concerning some disorders which had crept into the churches of Spain. Gracian published a collection of decretals, containing all the ordinances made by the popes, till the year 1150. Gregory IX. in 1227, following the example of Theodosius and Justinian, formed a constitution of his own, collecting into one body all the decisions, and all the causes, which served to advance the papal power: which collection of decretals was called the pentateuch, because it contains five books.

DECUMANA, in antiquity, a kind of very large shields, otherwise called albesia, used by the Albenses, a nation of the Marsi.

DECUMANNI DENTES, in heraldry, the same with dancette. See DANCETTE.

DECUPLE PROPORTION, that of ten to one. See the article PROPORTION.

DECURIO, in roman antiquity, a commander of ten men in the army, or the chief of a decury. See DECURY.

DECURIO MUNICIPALIS, a name given to the fenators of the roman colonies.

DECURIO, as appears from an infcription in Gruter, was alfo a name given to certain priefts, intended for particular facrifices or other religious ceremonies. Struvius conjectures that their name was derived from their affifting at the facrifices of private families and houfes.

DECURRENT LEAF, one which adheres immediately to the ftalk of a plant, without any pedicle, and which has its lower part extended, and running a little way along the branch.

DECURY, ten perfons ranged under one chief, or leader, called the decurio. See the article DECURIO.

The roman cavalry was divided into decuries, which were fubdivifions of a century, each century containing ten decuries.

DECUSSATION, a term in geometry, optics, and anatomy, fignifying the croffing of any two lines, rays, or nerves, when they meet in a point, and then go on feparately from one another.

DECUSSORIUM, a furgeon's inftrument, which, by preffing gently on the dura mater, caufes an evacuation of the pus collected between the cranium and the before-mentioned membrane, through the perforation made by the trepan.

DEDDINGTON, a market-town of Oxfordfhire, about fifteen miles north of Oxford: weft longitude 1° 20′, and north latitude 51° 55′.

DEDHAM, a market-town of Effex, about thirty-five miles north-eaft of Chelmsford: eaft longitude 1° 10′, and north latitude 52° 5′.

DEDI, in conveyances, imports a warranty given to a feoffee and his heirs. See the article WARRANTY.

DEDICATION, a folemn devoting, or fetting apart, any perfon or thing, to the fervice of God, and the purpofes of religion. See CONSECRATION.

Dedication of a temple was performed by the heathens in the following manner: early in the morning, on the day of dedication, the college of the pontiffs and other orders met, with a great crowd of people; and furrounding the temple, with garlands of flowers, the veftal virgins holding branches of olive-trees in their hands, fprinkled the outfide of the temple with luftral water; then the perfon who confecrated the temple, being the office of fome great magiftrate, as prætor, cenfor, *&c.* drew near the gate, with a pontiff at his fide, to fhew him the ceremonies; and holding with one hand the fide-poft of the gate, fpoke thus: *Ades, ades, Lucelle,* (for example) *dum dedico templum hoc, ut mihi præeatis, poftemque teneatis.* Then the pontiff, holding the ceremonial in his hand, pronounced aloud the form of the confecration, which the confecrating perfon repeated after him, and the ceremony was expreffed in thefe words, *folemnia verba præeunte pontifice effari.* After which they confecrated the court of the temple, by facrificing a beaft, whofe entrails were laid on an altar of green turf; then, having taken the ftatue of the deity to whom it was confecrated they anointed it with oil, and laid it on a pillow, rubbed with oil: the ceremonies being over, the confecrating perfon had an infcription, containing his name, quality, and the year of the confecration, fet upon the temple. This dedication was to be authorized by the fenate and people, and the college of pontiffs was to give their confent to it.

Feaft of DEDICATION, an anniverfary feftival among the Jews, in memory of Judas Maccabæus, who repaired and dedicated anew the temple and altar, which had been plundered and profaned by Antiochus Epiphanes. It was obferved on the twenty-fifth of Cifleu, and continued eight days.

The feaft of DEDICATION, or rather the feaft of a faint, or patron of a church, called in our law-books *dedicare,* was celebrated not only by the inhabitants of the place, but by thofe of all the neighbouring villages, who reforted thither; and fuch affemblies were authorifed by the king. The cuftom is ftill retained in fome places, under the name of wakes, or vigils.

DEDICATION, in matters of literature, the infcribing a book, poem, play, or the like, to fome perfon of diftinction, ferving both as a protection to the piece, and a mark of the author's refpect for the perfon to whom he dedicates his work.

Conringius has publifhed a collection of dedications, which may be of ufe to thofe employed in this way, as containing many obfervations relative to divinity, hiftory, phyfics, *&c.* according to the different fubjects of the books. He has fubjoined

joined the prefaces and dedications of Puteanus, publiſhed by himſelf under the title of Pompæ Proſphoneticæ.

We cannot help obſerving, that dedications partake much of the nature of panegyric, being not only written in a pompous and florid ſtile, but full of the praiſes of the patron. See the article PANEGYRIC.

One of the moſt ſingular dedications we ever met with, and for which the author makes a very good apology, is that of the fourth part of Mr. Edwards's Hiſtory of Birds; it runs thus:

TO
GOD,

The ONE Eternal! the Incomprehenſible! the Omnipreſent! Omniſcient, and Almighty CREATOR of all things that exiſt! from Orbs immenſurably great, to the minuteſt Points of Matter, this ATOM is Dedicated and Devoted, with all poſſible Gratitude, Humiliation, Worſhip, and the higheſt Adoration, both of Body and Mind, by

his moſt reſigned, low,
and humble Creature,

GEORGE EDWARDS.

DEDIMUS POTESTATEM, in law, a commiſſion granted to one or more perſons, for the forwarding and diſpatching ſome act appertaining to a judge, or ſome court; as to take anſwers in chancery, depoſitions of witneſſes in a cauſe depending in that court, and levy a fine in the common pleas, &c. where perſons live in the country, or cannot travel.

DEDUCTION, in commerce, a ſubtracting or retrenching a little ſum paid, from a greater remaining yet unpaid.

DEDUTTIONE, in muſic, a name given to the riſing of the voice, in pronouncing the ſyllables *ut, re, mi, fa, ſol, la*; *quia per has deducitur vox*; in contradiſtinction to reductio, when the voice deſcends by theſe *la, ſol, fa, mi, re, ut*; *quia per has reducitur vox*.

DEE, the name of ſeveral rivers, as that on which Cheſter ſtands, that whereon Aberdeen ſtands, &c. See the articles CHESTER and ABERDEEN.

DEED, an inſtrument written on paper or parchment, comprehending ſome contract, bargain, or agreement between the parties thereto, in relation to the matter therein contained.

The validity of a deed conſiſts in three principal things, *viz.* writing, ſealing, and delivery. There are two kinds of deeds, *viz.* deeds indented, and deeds poll; which names chiefly import the ſhape of them, the one being cut in and out at top, and the other plain. A deed indented conſiſts of two or more parts; for there are tripartite, quadripartite, quinquepartite, &c. deeds, in which reſpective deeds it is expreſſed, that the parties thereto have interchangeably ſet their hands and ſeals. The reaſon of indenting is, that whereas the ſeveral parties have each of them one, the indenture may make it appear, that they belong to one and the ſame contract, by their tallying. The ſeveral parts of deeds by indenture appertain to the feoffer, grantor, or leſſor, &c. as to one part; the feoffee, grantee, or leſſee, of another part; and ſome other perſons, as truſtees, a third, &c. All the parts of an indented deed, in law, are judged to make but one entire deed, yet each part is of as great force as all the parts together.

A deed poll is that which conſiſts only of one part, without being indented. It is uſed where a grantor, or vender in a bill of ſale, &c. only ſeals: there is no need of a counterpart, the nature of the contract being ſuch, that it requires no covenant from the grantee.

DEEMSTERS, or DEMSTERS. All controverſies in the Iſle of Man are decided without proceſs, writings, or any charges, by certain judges, choſen yearly from among themſelves, called deemſters; there being two of them for each diviſion of the iſland: they ſit judges in all courts, either for life or property; and, with the advice of the twenty-four keys, declare what is law, in uncommon emergencies.

DEEP SEA-LINE, or DIP-SEA-LINE, in the ſea-language, a ſmall line to ſound with, ſome an hundred and fifty fathom long, with a hollow plummet at the head, and tallow put into it, to bring up ſtones, gravel, ſand, ſhells, and the like, from the bottom, in order to know the differences of the ground; which being entered from time to time, in their books, by comparing of obſervations, they gueſs by their ſoundings, &c. what coaſts they are on, though they cannot ſee land.

DEEPING, a market-town of Lincolnſhire, about thirty-five miles ſouth of Lincoln: weſt lon. 20′, and north lat. 52° 35′.

DEER, *cervus*, in zoology. See the article CERVUS.

DEER-HAYS, large nets, made of cords, to catch deer. Whoever keeps them, except in his own park, forfeits forty ſhillings a month.

DEER-STEALERS are puniſhable by various laws and ſtatutes, made from time to time. Any offender convicted of deer-ſtealing, before a judge of gaol-delivery, may be tranſported by 5 Geo. I. cap. xxviii. And it is felony for perſons to appear armed and diſguiſed in a foreſt or park, and hunt or kill the deer, by 6 Geo. I. cap. xxii.

DE ESSENDO QUIETUM DE TOLONIO, in law, a writ which lies for thoſe, who, by privilege, are free from the payment of toll, whenever they are diſturbed therein.

DE EXPENSIS MILITUM, in law, an antient writ, commanding the ſheriff to levy the expences of a knight of the ſhire, for his attendance in parliament, being four ſhillings a day. There is alſo another writ of the like nature, *de expenſis civium & burgenſium*, for levying two ſhillings a day, for the expences of every citizen and burgeſs of parliament.

DE FACTO, ſomething actually in fact, or exiſting, in contradiſtinction to de jure, where a thing is only ſo in juſtice, but not in fact; as a king de facto is a perſon that is in actual poſſeſſion of a crown, but has no legal right to the ſame; and a king de jure is the perſon who has a juſt right to the crown, though he is out of poſſeſſion thereof.

DEFAMATION, the ſpeaking ſlanderous words of another; for which the ſlanderer is puniſhable, according to the nature of his offence, either by action upon the caſe at common law, or by ſtatute, or in the eccleſiaſtical court. No damages are given in the eccleſiaſtical court, but the puniſhment of the party is by way of penance.

DEFAULT, in law, is generally taken for non-appearance in court, at a day aſſigned; but imports any omiſſion of that which we ought to do, for which judgment may be given againſt the defaulter. In the uſual ſenſe, if the plaintiff in a ſuit make default in appearance on a trial, he will be non-ſuited; and where a defendant makes default, judgment ſhall be had againſt him by default. Jurors making default in their appearance, are to loſe and forfeit iſſues.

DEFECATE, or DEFÆCATE, in chemiſtry, a term applied to a body freed and purged from fæces and impurities. See the article CLARIFICATION, &c.

DEFECTIVE NOUNS, thoſe which want one of the numbers, or one or more caſes. See the article NOUN.

DEFEISANCE, or DEFEASANCE, in our law, a condition relating to ſome certain deed, which being performed, the deed is defeated and rendered void, as if it had never been made.

There is this difference between a common condition and a defeiſance, *viz.* that the condition is inſerted in, or annexed to the deed; but the defeiſance is a deed by itſelf, which has relation to another deed.

DEFENCE, in fortification, all ſorts of works that cover and defend the oppoſite poſts, as flanks, caſemates, parapets, and fauſſebrays.

It is almoſt impoſſible to fix the miner to the face of a baſtion, till the defences of the oppoſite one are ruined, that is, till the parapet of its flank is beaten down, and the cannon, in all parts that can fire upon that face which is attacked, are diſmounted.

To be in a poſture of DEFENCE, is to be in a condition to reſiſt or oppoſe an enemy.

Line of DEFENCE, a ſuppoſed line drawn from the angle of the curtin, or from any other part in the curtin, to the flanked angle of the oppoſite baſtion. See the articles CURTIN and BASTION.

A line of defence repreſents the flight of a muſquet-ball from the place where the muſqueteers ſtand, to ſcour the face of the baſtion, and ought never to exceed the reach of a muſquet. It is either fichant or razant; the firſt is when it is drawn from the angle of the curtin to the flanked angle: the laſt, when it is drawn from a point in the curtin, razing the face of the baſtion.

DEFENCE, in law, ſignifies a plea, or what the defendant ought to make after the plaintiff's count, or declaration, *viz.* that he defends all the wrong, force, and damages, where and when he ought, &c. If the defendant would plead to the juriſdiction, he muſt omit the words *where and when he ought*; and if he would ſhew any diſability in the plaintiff, and demand judgment, if the plaintiff ſhall be anſwered unto, then he ought to omit the defence of the damage. There is a full defence uſually in perſonal actions.

DEFENCES, in heraldry, are the weapons of any beaſt, as the horns of a ſtag, the tuſks of a wild boar, &c.

DEFENDANT, in law, the perſon ſued in

in an action perfonal; as tenant is he who is fued in an action real. See the article Action.

DEFENDEMUS, in law, a word formerly ufed in gifts and grants, having this force, that it binds the donor and his heirs to defend the donee, if any perfons claimed right to, or laid any incumbrance on, the thing given, otherwife than is contained in the deed of gift.

DEFENDER *of the faith*, a peculiar title, belonging to the king of Great Britain, as Catholic does to the king of Spain, Chriftian to the king of France, &c.

This title was firft given by pope Leo X. to king Henry VIII. for writing againft Luther.

DEFENDING, in fortification, the fame with flanking. See the articles Defence and Flanking.

DEFENSITIVE, in furgery, fignifies a bandage, plafter, &c. to defend any part from external injuries.

DEFERENT, in anatomy, a term applied to certain veffels in the body, that ferve for the conveyance of humours from one part to another. See Deferentia vasa.

Deferent, in the ptolemaic aftronomy, a circle invented to account for the eccentricity, perigee, and apogee of the planets. See the articles Epicycle and Ptolemaic system.

DEFERENTIA vasa, two white, folid, flatted tubes, one lying on the right fide, the other on the left, from the epididymis, of which they are continuations: each of them runs up in the cellular vagina of the fpermatic veffels, as high as the openings in the abdominal mufcles; the blood veffels lying forward, and the vas deferens behind them.

Their ufe is to carry the femen from the epididymes to the veficulæ feminales; and, in the coitus, to difcharge it into the urethra.

DEFICIENT hyperbola, one with only one afymptote, and two hyperbolical legs running out infinitely towards the afymptote, but contrary ways. See the article Hyperbola.

Deficient interval, in mufic, one lefs by a comma than it ought to be. See Comma and Interval.

Deficient numbers, thofe whofe parts or multiples added together, fall fhort of the integer whereof they are the parts; fuch is 8, its parts, 1, 2, 4, making only 7. See the article Number.

DEFILE, in fortification, a ftrait narrow paffage, through which a company of horfe or foot can pafs only in file, by making a fmall front; fo that the enemy may take an opportunity to ftop their march, and to charge them with fo much the more advantage, in regard that thofe in the front and rear, cannot reciprocally come to the relief of one another.

To Defile is to reduce an army to a fmall front, in order to march through a defile.

DEFINITE, in grammar is applied to an article that has a precife determinate fignification; fuch as the article *the* in englifh, *le* and *la* in french, &c. which fix and afcertain the noun they belong to to fome particular, as *the king, le roy*; whereas in the quality *of king, de roy*, the articles *of* and *de* mark nothing precife, and are therefore indefinite.

DEFINITION, the fhewing the meaning of one word by feveral other not fynonymous terms.

The meaning of words being only the ideas they are made to ftand for, by him that ufes them, the meaning of any term is then fhewed, or the word is defined, when, by other words, the idea it is made the fign of, and is annexed to it in the mind of the fpeaker, is, as it were, reprefented and fet before the view of another; and thus its fignification is afcertained. This is the only end and ufe of definitions, and therefore the only meafure of what is, or is not, a good definition.

The names then of fimple ideas are incapable of being defined, becaufe the feveral terms of a definition fignifying feveral ideas, they can altogether by no means, reprefent an idea which has no compofition at all; and therefore a definition, which is properly but fhewing the meaning of any one word by feveral others, not fignifying the fame each, can in the names of fimple ideas have no place.

Definitions, which then take place in compound ideas only, are of two forts: the definition of the name, which is the explanation of what any word means; and the definition of the thing, which explains in what the nature of that thing confifts.

In order to form a definition of any thing, we muft employ thefe three acts of the mind, firft compare the thing to be defined with other things that are moft like to itfelf, and fee wherein its effence and nature agrees with them; and that is called the general nature or genus in a definition: fo, if you would define what *wine* is, firft compare it with other things like itfelf, as cyder, perry, &c. and you will find

find that it agrees effentially with them in this, that it is a fort of juice. Secondly, confider the moft remarkable and primary attribute, property, or idea, wherein the thing differs from thofe other things that are moft like it, and that is its effential or fpecific difference: fo that wine differs from cyder and perry, and all other juices, in its being preffed from a grape. This may be called its fpecial nature, which diftinguifhes it from other juices.

Thirdly, join the general and fpecial nature together, or the genus and the difference, and thefe make up a definition; fo the juice of a grape, or juice preffed from grapes, is the definition of wine. Here it muft be obferved, that in fpeaking of the genus and difference, as compofing a definition, it muft always be underftood, that the neareft genus and fpecific difference are required.

The next general nature, or the neareft genus, muft be ufed in a definition, becaufe it includes all the reft: as if I were to define *wine*, I muft fay, *wine is a juice*, which is the neareft genus; and not fay, *wine is a liquid*, which is a remote general nature; or, *wine is a fubftance*, which is yet more remote, for *juice* includes both *liquid* and *fubftance*. Befides neither of thefe two remote general natures would make any diftinction betwixt wine and a thoufand other fubftances, or other liquids: a remote genus leaves the thing too much undiftinguifhed. The fpecific difference is that primary attribute which diftinguifhes each fpecies from one another, while they ftand ranked under the fame general nature or genus; fo that the fpecific difference of wine is its preffure from the grape, as cyder is preffed from apples, and perry from pears.

In definitions we muft alfo ufe the primary attribute that diftinguifhes the fpecies, or fpecial nature; and not attempt to define wine by its particular taftes, or effects, or rather properties, which are but fecondary, or confequential, when its preffure from the grape is the moft obvious and primary diftinction of it from all other juices. In fome cafes, indeed, it is not fo eafily known, which is the primary idea that diftinguifhes one thing from another; fo fome would as foon define winter by the coldnefs of the feafon, as by the fhortnefs of the days, though the fhortnefs of the days is doubtlefs the moft juft, primary, and philofophical difference; fince winter-days are always the fhorteft, but not always the coldeft: befides, the fhortnefs is one caufe of the coldnefs, but the coldnefs is no caufe of their fhortnefs.

The fpecial rules for a good definition are thefe: 1. A definition muft be univerfal, or adequate, that is, it muft agree to all the particular fpecies or individuals that are included under the fame idea. 2. It muft be proper, and peculiar to the thing defined, and agree to that alone. Thefe two rules, being obferved, will always render a definition reciprocal with the thing defined, that is, the definition may be ufed in the place of the thing defined; or they may be mutually affirmed concerning each other. 3. A definition fhould be clear and plain; and indeed it is a general rule concerning the definition both of names and things, that no word fhould be ufed in either of them, which has any difficulty in it, unlefs it has been before defined. 4. A definition fhould be fhort, fo that it muft have no tautology in it, nor any words fuperfluous. 5. Neither the thing defined, nor a mere fynonymous name fhould make any part of the definition.

Though the defining by the genus and difference be the fhorteft way, yet it may be doubted whether it be the beft; certainly it is not the only, and fo not abfolutely neceffary. Thus, *man* may be defined to be *a folid extended fubftance, having life, fenfe, fpontaneous motion, and the faculty of reafoning:* and certainly the meaning of the word *man* would be as well underftood as when it is defined *a rational animal.*

DEFINITION, in rhetoric, is defined by Cicero, a fhort comprehenfive explanation of a thing.

The definitions of the orator, it muft be obferved, differ much from thofe of the logician and philofopher: the orators take a large compafs, and define things more ornamentally: thus, *man is a curious work of an almighty Creator, framed after his own image, endued with reafon, and born with immortality*: but this rhetorical definition, in ftrictnefs, comes nearer to the nature of a defcription, than any accurate definition.

DEFINITIVE, a term applied to whatever terminates a procefs, queftion, &c. in oppofition to provifional and interlocutory.

DEFINITOR is ufed for an affeffor or counfellor of a general or fuperior in monafteries, or other religious places. See MONASTERY and CONVENT.

DEFLAGRATION, in chemiftry, the kindling

kindling or ſetting fire to a ſalt, mineral, &c. either alone or mixed for that purpoſe, with a ſulphureous one, in order to purify it.

The following proceſs is much recommended for its uſe in trying the ſtrength of brandies, or other vinous liquor: meaſure out a quantity of the liquor, and then heat it, and ſet it on fire; if, after it ceaſes to burn, the quaintity remaining is half as much as that meaſured out for the trial was, then the ſpirit is found to conſiſt of half water, and half totally inflammable ſpirit, that is, it is what we underſtand by perfect proof; and according as the remainder is more or leſs than half the original quantity, it is ſo much below or ſo much above proof. This method is much more certain than that by the crown of bubbles, which ariſes upon ſhaking the ſpirit in a phial. The above proceſs has been greatly improved by Monſ. Geoffroy. See Mem. Acad. Paris, 1718.

DEFLECTION, *of the rays of light*, a property which Dr. Hook obſerved in 1675, and read an account of before the Royal Society, March 18, the ſame year. He ſays, he found it different both from reflection and refraction, and that it was made towards the ſurface of the opaque body, perpendicularly.

This is the ſame property which Sir Iſaac Newton calls inflection. See the article INFLECTION.

DEFLOWERING, the act of taking away a woman's virginity. See VIRGINITY.

DEFLUXION, in medicine, the falling of humours from a ſuperior to an inferior part of the body. See CATARRH and PHTHISIS.

DEFLUXION *of the eyes*. See EYE.

DEFORCEMENT, in law, the caſting any one out of his land, or a with-holding of lands and tenements by force from the right owner.

DEFORCEMENT, in the law of Scotland, is uſed for reſiſting, or offering violence to the officers of the law, while they are actually employed in the exerciſe of their functions, by putting its orders and ſentences in execution.

The puniſhment of this crime is confiſcation of moveables, joined with ſome arbitrary puniſhment, as fine, impriſonment, baniſhment, or corporal pains, according to the degrees of violence, and other circumſtances which aggravate the crime.

DEFORCEOR, in law, a perſon that overcomes and caſts forth another from his lands and tenements by force, and differs from a diſſeiſor on this account. 1. That a man may be diſſeiſed without force. 2. A man may deforce another that never was in poſſeſſion, as where many have a right to lands, as common heirs, and one of them enters and keeps out the reſt. A deforceor likewiſe differs from an intruder who is made by a wrongful entry only into land, &c. void of a poſſeſſor, whilſt a deforceor is he that holds out againſt the right heir. See the articles DISSEISOR and INTRUSION.

DEFORMITY, the want of that uniformity neceſſary to conſtitute the beauty of an object. See the article BEAUTY.

The deformity of the body may be prevented by forming and moulding it in infancy, as by ſtroking up the calves of the legs to keep them from falling too low; and by ſtroking up the forehead, to keep it from ſinking, by proper bandages, &c.

According to a late ingenious writer, the proper province of a deformed perſon is the improvement of the mind; and his buſineſs, only ſuch as depends on ingenuity. If he cannot be a dancing-maſter, to adjuſt the heels, he may be a ſchoolmaſter, to inſtruct the head. He would appear ill, as a herald in a proceſſion; but may paſs very well, as a merchant upon the exchange. He cannot be a graceful actor on the ſtage, but he may produce a good play. He can acquire no glory by the ſword, but he may by the pen. On looking about him, he will find many avenues to fame barred againſt him: but ſome are ſtill open, thro' that of virtue; and thoſe, if he has a right ambition, he will moſt probably attempt to paſs.

In this manner does that truly ingenious writer apologize for, and make the encomium of deformity. See *Hay*'s Eſſay on Deformity.

DEGENERATION, or DEGENERATING, in general, denotes the growing worſe, or loſing ſome valuable qualities whereof a thing was formerly poſſeſſed.

Some naturaliſts have been of opinion, that things are capable of degenerating into a quite diſtinct ſpecies; but this is a chimera. All that happens, in the degeneration of a plant, for inſtance, is the loſing its uſual beauty, colour, ſmell, &c. a misfortune entirely owing to its being planted in an improper ſoil, climate, &c.

DEGLUTITION, in medicine, the act of ſwallowing the food performed by means of the tongue driving the aliment

into

into the œſophagus, which, by the contraction of the ſphincter, protrudes the contents downwards.

DEGRADATION, the act of depriving a perſon for ever of a dignity or degree of honour, and taking away the title, badge and privileges of it.

DEGRADATION is alſo a puniſhment of delinquent eccleſiaſtics. The canon-law diſtinguiſhes it into two ſorts, the one ſummary, by word only; the other ſolemn, by ſtripping the perſon degraded of thoſe ornaments and rights which are the enſigns of his order or degree. The canoniſts likewiſe diſtinguiſh degradation from depoſition, underſtanding by the latter the depriving a man of his clerical orders, but by the former, only the removing him from his rank or degree. In the antient primitive church, degrading a clergyman was reducing him to the ſtate and communion of laymen, by which Voſſius and others underſtand the thruſting down a clergyman to communicate with laymen, without the rails of the chancel. The full import of the phraſe, however, is the depriving him of his orders, and reducing him to the ſimple condition of a layman, a puniſhent inflicted for ſeveral offences, as adultery, theft, or fraud: and clergymen thus reduced, were ſeldom allowed to recover their antient ſtation, except upon ſome great neceſſity, or very preſſing reaſon. Some have thought that degradation did not reduce the clergy to the ſtate of mere laymen, and that on account of the indelible character acquired by ordination, but this is an opinion unknown to the antient writers of the chriſtian church. Degradation in the romiſh church is attended with a great deal of ceremony. The offender is ſtripped of his pontifical veſtments, and at the ſame time the perſon who degrades him ſcrapes his fingers with a knife, or a little piece of glaſs, declaring to him that the power of conſecrating, bleſſing and ſanctifying, is taken from him: he eraſes the marks of the tonſure in the ſame manner, which a barber compleats by ſhaving his head all over.

DEGRADATION, in painting, expreſſes the leſſening the appearance of diſtant objects in a landſkip, in the ſame manner as they would apper to an eye placed at that diſtance from them. See the articles PERSPECTIVE and LANDSKIP.

DEGRADED CROSS, in heraldry, a croſs divided into ſteps at each end, diminiſhing as they aſcend towards the center, called by the french perronnée. See plate LXVII. fig. 8.

DEGREE, in geometry, a diviſion of a circle, including a three hundred and ſixtieth part of its circumference.

Every circle is ſuppoſed to be divided into three hundred and ſixty parts, called degrees, and each degree divided into ſixty other parts, called minutes; each of theſe minutes being again divided into ſixty ſeconds, each ſecond into thirds, and each third into fourths, and ſo on. See the articles MINUTE, SECOND, &c. By this means no more degrees or parts are reckoned in the greateſt circle than in the leaſt that is, and therefore if the ſame angle at the center be ſubtended by two concentrical arches, as many degrees are counted in the one, as in the other; for theſe two arches have the ſame proportion to their whole peripheries. For example, Let A C B (plate LXVII. fig. 9.) be an angle, and from the center C let there be deſcribed two arches, A B, D E, ſubtending the angle. There are as many degrees and minutes contained in the arch A B, as in the arch DE, altho' the radius of the arch A B were only a foot long, and the radius of the other reached the fixed ſtars. It is true indeed that a degree in the arch A B is ſo much leſs than a degree of the arch DE, as its radius C B is leſs than C E. The angle C is ſaid to be of ſo many degrees or minutes as the arch which ſubtends it contains of ſuch parts.

DEGREE *of latitude*. See LATITUDE.

DEGREE *of longitude*. See LONGITUDE.

A degree of the meridian on the ſurface of the globe is variouſly determined by various obſervers. Mr. Picart meaſured a degree in the latitude of 49° 21′, and found it equal to 57060 french toiſes. But the french mathematicians, who have lately examined Mr. Picart's operations, aſſure us, that the degree in that latitude is 57183 toiſes. Our countryman Mr. Norwood meaſured the diſtance between London and York, and found it 905751 engliſh feet, and finding the difference of latitudes 2° 28′, determined the quantity of one degree to be 367196 engliſh feet, or 69 engliſh miles, 288 yards. Mr. Maupertius meaſured a degree in Lapland, in the latitude of 66° 20′, and found it 57438 toiſes. A degree was likewiſe meaſured at the equator by other french mathematicians, and found to be conſiderably leſs than in the latitude of Paris. Whence it appears, that the earth is not a

a ſphere, but an oblate ſpheroid. See the articles Earth, Spheroid, &c.

Our theory of navigation being founded upon an hypotheſis of the degrees of latitude being all equal, muſt of conſequence be very erroneous, wherefore we here inſert a table of the degrees in the quadrantal arch of the meridian, both in the ſphere and ſpheroid with their differences, as calculated by the Rev. Mr. Murdoch.

A Table of Arches of the Meridian to the Spheroid and Sphere, in Minutes of the Equator.

Degrees	Spheroid.	Sphere.	Diff.	Degrees	Spheroid.	Sphere.	Diff.
1	58.7	60.0	1.3	46	2716.4	2760.0	43.6
2	117.3	120.0	2.7	47	2776.2	2820.0	43.8
3	176.0	180.0	4.0	48	2835.9	2880.0	44.1
4	234.7	240.0	5.3	49	2895.5	2940.0	44.5
5	293.4	300.0	6.6	50	2955.3	3000.0	44.7
6	352.1	360.0	7.9	51	3015.2	3060.0	44.8
7	410.8	420.0	9.2	52	3075.0	3120.0	44.9
8	469.6	480.0	10.4	53	3135.0	3180.0	45.0
9	528.3	540.0	11.7	54	3194.9	3240.0	45.1
10	587.0	600.0	13.0	55	3254.9	3300.0	45.1
11	645.8	660.0	14.2	56	3314.9	3360.0	45.1
12	704.5	720.0	15.5	57	3370.0	3420.0	45.0
13	763.3	780.0	16.7	58	3435.1	3480.0	44.9
14	822.1	840.0	17.9	59	3495.2	3540.0	44.8
15	880.9	900.0	19.1	60	3555.3	3600.0	44.7
16	939.7	960.0	20.3	61	3615.5	3660.0	44.5
17	998.5	1020.0	21.5	62	3675.7	3720.0	44.3
18	1057.4	1080.0	22.6	63	3736.0	3780.0	44.0
19	1116.3	1140.0	23.7	64	3796.2	3840.0	43.8
20	1175.2	1200.0	24.8	65	3856.5	3900.0	43.5
21	1234.1	1260.0	25.9	66	3916.8	3960.0	43.2
22	1293.0	1320.0	27.0	67	3977.2	4020.0	42.8
23	1352.0	1380.0	28.0	68	4037.5	4080.0	42.5
24	1411.0	1440.0	29.0	69	4097.9	4140.0	42.1
25	1470.0	1500.0	30.0	70	4158.4	4200.0	41.6
26	1529.0	1560.0	31.0	71	4218.8	4260.0	41.2
27	1588.1	1620.0	31.9	72	4279.3	4320.0	40.7
28	1647.2	1680.0	32.8	73	4339.8	4380.0	40.2
29	1706.3	1740.0	33.7	74	4400.3	4440.0	39.7
30	1765.5	1800.0	34.5	75	4460.8	4500.0	39.2
31	1824.7	1860.0	35.3	76	4521.3	4560.0	38.7
32	1883.9	1920.0	36.1	77	4581.9	4620.0	38.1
33	1943.1	1980.0	36.9	78	4642.5	4680.0	37.5
34	2002.4	2040.0	37.6	79	4703.1	4740.0	36.9
35	2061.7	2100.0	38.3	80	4763.7	4800.0	36.3
36	2121.0	2160.0	39.0	81	4824.3	4860.0	35.7
37	2180.4	2220.0	39.6	82	4884.9	4920.0	35.1
38	2239.8	2280.0	40.2	83	4945.5	4980.0	34.5
39	2299.2	2340.0	40.8	84	5006.2	5040.0	33.8
40	2358.7	2400.0	41.3	85	5066.8	5100.0	33.2
41	2418.2	2460.0	41.8	86	5127.5	5160.0	32.5
42	2477.7	2520.0	42.3	87	5188.2	5220.0	31.8
43	2537.3	2580.0	42.7	88	5248.8	5280.0	31.2
44	2596.8	2640.0	43.2	89	5309.5	5340.0	30.5
45	2656.6	2700.0	43.4	90	5370.2	5400.0	29.8

DEGREE, *in the civil and canon law*, denotes an interval in kinſhip, by which proximity and remoteneſs of blood are computed. In computing degrees of conſanguinity, the rule of the civil law is univerſal, either in the direct or collateral, otherwiſe called the oblique line, for as many generations as there are, ſo many degrees there are likewiſe. But in the canon-law, the rule is different for the oblique line. And here a diſtinction is made between the equal and the unequal oblique line. In the firſt caſe the rule is, as many degrees as the perſons allied are diſtant from the common ſtock, ſo many they are diſtant from one another. In the other caſe the rule is: As many degrees as the moſt remote is diſtant from the common ſtock, ſo many the perſons are diſtant from one another. Hence the ſiſter of a perſon's grandfather by the civil law is diſtant from that perſon in the fourth degree; whereas, by the canon-law, ſhe is only in the third degree.

DEGREE, in chemiſtry, denotes the ſtate or intenſeneſs of fire. See FIRE.

Conjoint DEGREES. See CONJOINT.

DEGREES *of compariſon*, in grammar. See COMPARISON and POSITIVE, COMPARATIVE and SUPERLATIVE.

DEGREES, in muſic, are the little intervals whereof the concords, or harmonical intervals are compoſed. See the articles INTERVAL and CONCORD.

Muſical degrees are three, 1ſt. The greater tone whoſe ratio is 8 : 9. 2. The leſs tone, whoſe ratio is 9 : 10. and 3. The ſemitone, whoſe ratio is 15 : 16. By theſe alone a ſound can be moved upwards or downwards ſucceſſively, from one extreme of a concord to another, and produce true melody; and by means of theſe ſeveral voices are alſo capable of the neceſſary variety in paſſing from concord to concord. As to the original of theſe degrees, they ariſe out of the ſimple concords, and are equal to their differences. Thus 8 : 9, is the difference of a fourth and a fifth; 9 : 10, is that of a leſſer third and fourth, or of a fifth and greater ſixth; and 15 : 16, is the difference of a greater third and fourth, or of a fifth and a leſſer ſixth.

The degrees being only certain mediums contrived to be put betwixt the extreams of concords, for moderating their unequality, are of uſe only with regard to concords; ſo that when the voice has moved one degree, the ear is not ſatiſfied 'till we come to the other, which therefore muſt be concord to the firſt ſound. By the fit diviſion therefore, of the concording intervals into leſſer ones, the voice will move ſmoothly from one note to another, and the hearer be prepared for a more exquiſite reliſh of the perfect intervals, whoſe extreams are the proper notes in which the ear finds the expected reſt and pleaſure. For the uſe of the degrees in the conſtruction of the ſcale of muſic. See SCALE and GAMUT.

DEGREES in the peripatetic philoſophy, are thoſe entities which being multiplied in the ſame ſubject render it more active, and that intenſively rather than extenſively.

Parodical DEGREE, in algebra. See the article PARODICAL.

DEGREE, in univerſities, denotes a quality conferred on the ſtudents or members thereof as a teſtimony of their proficiency in the arts or ſciences, and intitling them to certain privileges.

The degrees are much the ſame in all univerſities, but the laws thereof, and the previous diſcipline or exerciſe differ. The degrees are batchelor, maſter, and doctor, inſtead of which laſt, in ſome foreign univerſities, they have licentiate. In each faculty, there are two degrees, batchelor and doctor, which were antiently called batchelor and maſter. In the arts likewiſe there are two degrees which ſtill retain the antient denomination, *viz.* batchelor and maſter. See BATCHELOR, MASTER, DOCTOR.

With regard to obtaining degrees at Oxford and Cambridge, matters are nearly on the ſame footing, only at Cambridge, the diſcipline is ſomewhat more ſevere, and the exerciſes more difficult. For the degree of batchelor of arts, beſides reſidence in the univerſity near four years, it is required that the perſon in the laſt year have defended three queſtions in natural philoſophy, mathematics, or ethics, and anſwered the objections of three ſeveral opponents at two ſeveral times; as alſo, that he have oppoſed three times. After which, being examined by the maſter and fellows of the college, he is referred to ſeek his degree in the ſchools, where he is to ſit three days, and be examined by two maſters of arts appointed for the purpoſe. For the degree of maſter of arts, the candidate is obliged three ſeveral times to maintain two philoſophical queſtions in the public ſchools, and to anſwer the objections brought againſt

against him by a master of arts. He must also keep two acts in the batchelors school, and declaim once.

To pass batchelor of divinity, the candidate must have been seven years master of arts: he must have opposed a batchelor of divinity twice, kept one divinity act, and preached before the university once in latin, and once in english.

For the degree of doctor, see DOCTOR.

DEICIDE, *deicida*, a term only used for the condemnation and execution of the Saviour of the world, by Pontius Pilate and the Jews.

DEJECTION, in medicine, the act of ejecting or evacuating the excrements. It is also applied to the excrements themselves thus evacuated, in which sense it is of the same import with stool. See the article STOOL.

DEJECTION, in astrology, is applied to the planets when they have lost their influence, as is pretended by reason of their being in opposition to some others: It is the contrary of their exaltation. See the article EXALTATION.

DEIFICATION, in antiquity, the same with apotheosis. See APOTHEOSIS.

DEINCLINERS, or DEINCLINING DIALS, are such as both decline and incline, or recline at the same time. Thus, if a plane cut the prime vertical circle at an angle of thirty degrees, and the horizontal plane under an angle of twenty-four degrees, the elevation of the pole being fifty-two degrees, a dial drawn on this plane is called a deincliner. See DIAL.

DEISM, the system of religion acknowledged by the deists. See the next article.

DEISTS, in the modern sense of the word, are those persons in christian countries, who acknowledging all the obligations and duties of natural religion, disbelieve the christian scheme, or revealed religion. They are so called from their belief in God alone, in opposition to Christians. The learned Dr. Clarke, taking the denomination in the most extensive signification, distinguishes deists into four sorts. 1. Such as pretend to believe the existence of an eternal, infinite, independent, intelligent Being, and who teach that this supreme Being made the world, though they fancy he does not at all concern himself in the management of it. 2. Those who believe not only the being, but also the providence of God with respect to the natural world, but who not allowing any difference between moral good and evil, deny that God takes any notice of the morally good or evil actions of men; these things depending, as they imagine, on the arbitrary constitutions of human laws. 3. Those who having right apprehensions concerning the natural attributes of God, and his all-governing providence, and some notion of his moral perfections also; yet being prejudiced against the notion of the immortality of the human soul, believe that men perish intirely at death, and that one generation shall perpetually succeed another, without any future restoration or renovation of things. 4. Such as believe the existence of a supreme Being, together with his providence in the government of the world, as also the obligations of natural religion; but so far only, as these things are discoverable by the light of nature alone, without believing any divine revelation. These last are the only true deists; but as the principles of these men would naturally lead them to embrace the christian revelation, the learned author concludes there is now no consistent scheme of deism in the world.

DEITY, a term frequently used in a synonymous sense with God. See GOD.

DELEGATES, commissioners appointed by the king under the great seal to hear and determine appeals from the ecclesiastical court.

Court of DELEGATES. See COURT.

DELEGATION, *delegatio*, a commission extraordinary given by a judge to take cognizance of, and determine, some cause, which ordinarily does not come before him.

DELEGATION, in the civil law, is a kind of nomination, whereby a debtor appoints one that is debtor to him, to answer a creditor in his place. This delegation differs from transferring, or translation, in that three persons intervene in a delegation, *viz.* the creditor, the debtor, and a third indebted to the debtor, whereas in a transfer, it is enough that the transferer and transferee be present.

DELETERIOUS, an appellation given to things of a destructive or poisonous nature. See the article POISON.

DELF, denotes a quarry or mine, where either stone or coal is dug; but is more particulary used for the veins of coal

lying under-ground, before it is dug up. A delf, or delve of coals, alſo denotes a certain quantity when dug.

Delf, in heraldry, is by ſome ſuppoſed to repreſent a ſquare rod or turf, and to be ſo called from delving, or digging. A delf tenne, is due to him that revokes his own challenge, or any way goes from his word; and to ſuch this is given as an abatement to the honour of their arms, and is always placed in the middle of the eſcutcheon. However, if two or more delfs are found in an eſcutcheon, they are not then to be looked upon as ſigns of an abatement, but of honour. Alſo, if it be of metal, or charged upon, it then becomes a charge of perfect bearing.

DELFT, a city of the united Netherlands, in the province of Holland, eight miles north eaſt of Rotterdam, and thirty ſouth-weſt of Amſterdam: eaſt long. 4° 5′, and north lat. 52° 6′.

DELIA, in antiquity, feaſts celebrated by the Athenians in honour of Apollo, ſurnamed Delius, the principal ceremony whereof was an embaſſy, or rather a pilgrimage to Apollo, performed every five years by a certain number of citizens, deputed for that purpoſe, called deliaſtæ, and the firſt perſon of the embaſſy architheorus: to him were added, four more of the family of the Ceryci, prieſts deſcended from Mercury, who reſided all the year at Delos, to aſſiſt in the temple. The whole deputation ſet out in five veſſels, carrying with them every thing neceſſary for the feaſt and the ſacrifices.

Delia was alſo a quinquennial feſtival in the iſland of Delos, inſtituted by Theſeus, at his return from Crete, in honour of Venus, whoſe ſtatue, given him by Ariadne, he erected on that place, having by her aſſiſtance met with ſucceſs in his expedition.

DELIAC, or Deliacal problem, a problem much celebrated in the writings of the antients, concerning the duplication of the cube. See the articles Duplication and Cube.

DELIBERATIVE, an appellation given to a kind, or branch, of rhetoric, employed in proving a thing, or convincing an aſſembly thereof, in order to perſuade them to put it in execution.

To have a deliberative voice in the aſſembly, is when a perſon has a right to give his advice and his vote therein. In councils, the biſhops have deliberative voices; thoſe beneath them have only conſultative voices.

DELICT, in the ſcotch law, denotes much the ſame with miſdemeanour. See the article Misdemeanour.

DELIGATION, in ſurgery, the binding up of wounds, diſlocations, fractures, &c. See the articles Wound, Dislocation, Fracture, &c.

DELIMA, in botany, a genus of plants belonging to the polyandria-monogynia claſs, with an elongated ſtyle: it has no flower-petals; the cup conſiſts of five leaves; the fruit is a bivalve capſule, and contains two ſeeds.

DELINEATION, or Delineating, the ſame with deſigning. See the article Designing.

DELINQUENT, a guilty perſon, or one who has committed ſome fault, or offence, for which he is puniſhable.

DEDIQUIUM, or Animi Deliquium, the ſame with lipothymia. See the article Lipothymia.

Deliquium, in chemiſtry, ſignifies the ſolution of any body, when expoſed to a cool and damp place, by the humidity it attracts from the air. The ſalt of tartar diſſolved in the above manner is called oil of tartar per deliquium.

DELIRIUM, in medicine, the production of ideas not anſwerable to external cauſes, from an internal indiſpoſition of the brain, attended with a wrong judgment following from theſe ideas, and an affection of the mind, and motion of the body, accordingly: and from theſe increaſed through various degrees, either alone or joined together, various kinds of deliria are produced.

The cauſes of deliria are numerous, ſuch as fevers, wounds in the head, internal inflammations, and immoderate loſſes of blood, whereby the brain is either diſordered or weakened. It alſo ariſes from the ſeed or menſes being retained in the womb, from the rotting of a gangrened member, &c. When a fierce and continual delirium is produced by an acute fever, from the brain itſelf originally affected, it is called a phrenſy; but a ſimple delirium only attends a violent fit of an intermitting fever, ſo that when the paroxyſm is off, the delirium ceaſes. See the article Phrensy.

Many are the ſigns of a delirium, as gnaſhing of the teeth, a fierce and wild aſpect, a pulſation in the hypochondrium and belly, watchings, vomiting of bile; in pains of the head, a tremor, or trembling

trembling of the tongue, &c. to all which Galen adds, the doing any thing unusual or indecent.

Various methods of cure, and different remedies are to be chose agreeable to the difference of the causes; but the chief of these remedies are warm bathing of the feet, with the application of blisters to them, and to the hams; frictions upon the same parts; diluent clysters often applied; a thin diet, and healing, quieting, deobstruent and diluent drinks; emollient remedies applied to the head; gentle purges; bleeding in the foot, a bringing down of the piles, or menstrual discharge, &c.

A delirium is always a bad sign in wounds of the head, because it denotes that the brain itself is injured.

DELIVERY, Child-birth, or Parturition, in medicine and surgery, the bringing forth a perfect fœtus, or child, from its mother's womb, whether it be alive, or dead. See Foetus.

In order to attain the knowledge of difficult childbirths, it is necessary to form a just idea of those that are natural. The time of the natural birth is, from the 15th day of the ninth month, to the end of the 30th of the same: yet some women affirm it may be sooner, or later. Hoffman says, the usual time is nine solar months; and Junker, that excretions from the uterus being by women referred to certain lunar phases, they reckon their going with child by the weeks, and that they usually exclude the fœtus forty weeks from the time of their being with child, commonly on that very day they were used to have their menses.

The signs of an approaching delivery, are a remarkable descent of the womb, and a subsidence of the belly; the head of the fœtus falls down to the orifice of the womb, and presses upon it. See plate LXVIII. n° 1. The orifice of the womb dilates by the weight; and the chorion and amnios, being driven forward with the waters they contain, form a kind of pouch, or bladder, at the said orifice; which should be suffered to break of itself, or, at least, it should not be burst till the woman is in labour. There is a flux of a whitish matter from the said orifice; pains which extend from the loins and groin towards the genital parts: there is a frequent desire to make water, or to go to stool; or a continual tenesmus: a flux of the waters from the membranes which contain the child immediately before the birth, or more early: a trembling of the lower joints: sometimes the head achs, and the face looks intensely red.

The infant gradually advances, the above protuberance continually enlarging the passage, that the crown of the head may be felt; the birth is then advanced one third; and the midwife may now assist the exclusion. When the infant is advanced forward, as far as his ears, he is said to be in the passage. If the membranes are not already burst, they may now be opened, and the waters by their effusion, will render the vagina slippery, and promote the expulsion of the infant. When the child is born, the midwife should lay him on her knees, so as to give issue to the waters from the mouth, if any has been imbibed: soon after, the placenta appears of itself, if not attached to the uterus: if otherwise, the midwife must separate it gently, by introducing her hand. The navel-string must now be cut, having first made a ligature as well on the child's side as on the mother's, to prevent a hæmorrhage.

The midwife, at first, having asked a few questions, ought to examine, by the touch, with the fore and middle finger, introducing them from time to time, to know the state of the uterus; and, as the child advances, she must relax the vagina by some oily remedy. The mother should regulate her throws, and use her efforts all at once, not divide them, especially when the head is advanced, that the shoulders may immediately follow, and the child escape the danger of strangling.

After the child is born, and the afterbirth brought away, let a warm linen cloth be applied to the parts, but not so as to hinder the flowing of the lochia. An hour after, let the mother take a little oil of sweet almonds, to ease the after-pains, and let a cataplasm of the oil of sweet almonds ℥ij. and two or three new laid eggs be boiled together, and laid to the parts, renewing it every six hours, for two days: fifteen days after the birth, the parts may be bathed with an astringent decoction of red roses, balaustines, or nut-galls, in red wine, in order to brace them. If the labour is long and difficult, it will be proper to bleed, to prevent inflammations, and to give a little Alicant-wine, or with the

addition of Cinnamon-water, or confectio alkermes, not forgetting an oily clyster.

A difficult DELIVERY may be caused by the mother, the midwife, or the fœtus. The fault is in the mother, if, when the orifice of the womb is open, and the child rightly placed, she has not strength to expel the fœtus, especially if the waters are come away, and the pains cease: or when the mother will not exert herself; or there is a natural fault in the genital parts. In a defect of strength, or pains, all else being right, a draught of generous wine should be given, with cinnamon and mace, again and again, if the work does not go forward. If there wants a greater stimulus, borax, cinnamon, or myrrh, may be given, with a proper drink, which must be repeated in an hour or two, if occasion requires. But the abuse of forcing medicines is dangerous: stimulating clysters may be injected now and then, especially if the woman is costive. The midwife should also press back the os coccygis, which tends to excite the pains, and to ease the labour. If the parts are overstrait, as in the first birth, especially if the woman is not young, emollient liniments are to be used, and the parts must be anointed with fresh butter, or oil, and be dilated gently with the fingers. If there is a tumor, caruncle, or membrane, opposing the birth, a surgeon's assistance is required.

The midwife is in fault, when she hastens the labour before the time, when there is no true pains, when the orifice of the uterus is not open, which alone distinguishes the true pains from false: the true time of birth must be waited for: the woman must be composed, and her spirits kept up with comfortable liquors.

If the fault is with the fœtus; and the head too large, or the shape monstruous, or the situation preternatural, then forcing medicines are fruitless and noxious; and the fœtus is brought forth by the feet, by a skilful hand, or the instrument called embryulcus, (ibid. n° 10, 11.) whether alive or dead. See EMBRYULCUS.

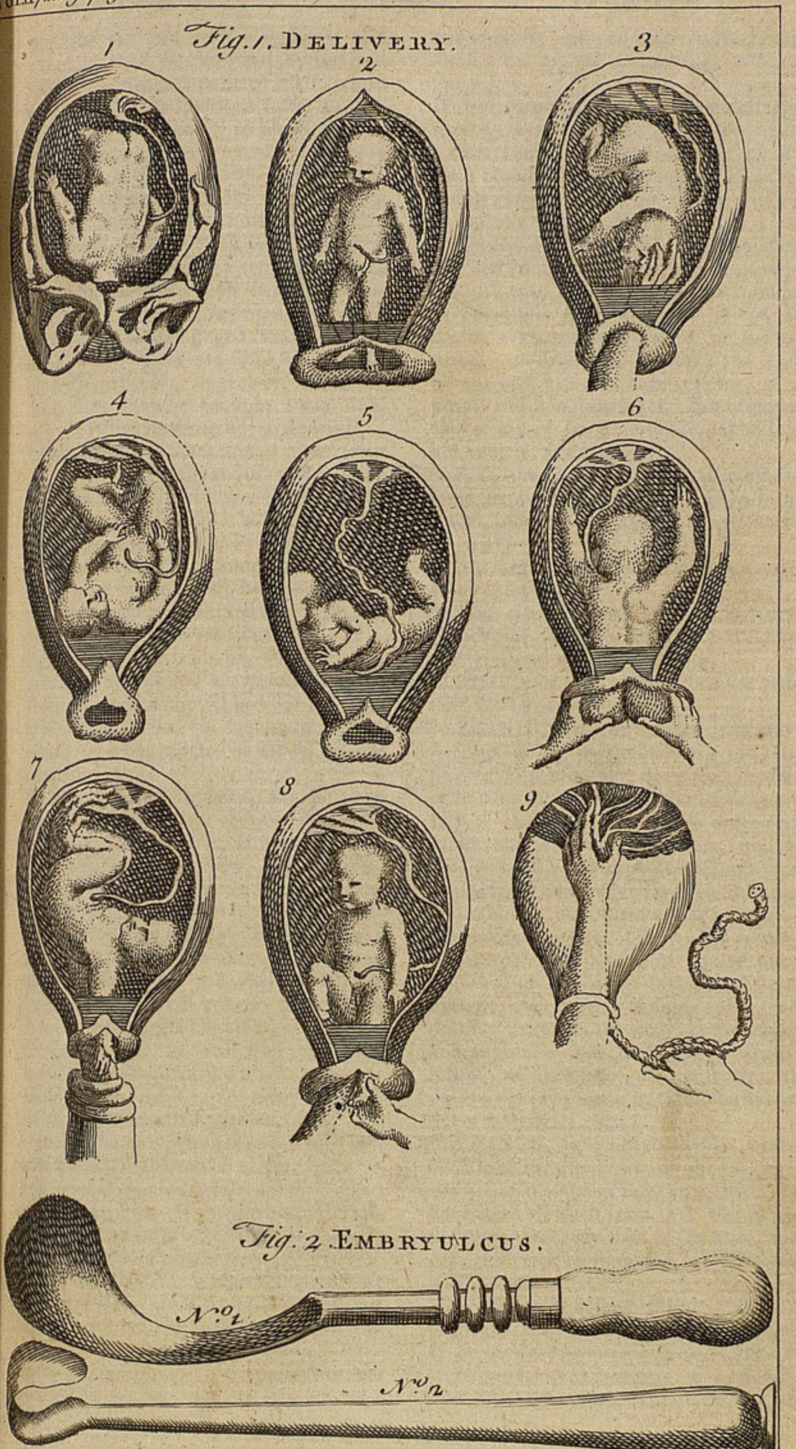
If the feet present first (ibid. n° 2.) the midwife must be wary, lest there be twins, and lest she should take a foot of each: the feet must be wrapped in a dry napkin, and the child must be drawn gently, till the waste is in the orifice of the uterus: then the infant's hands should be drawn close by the sides; and if the nose be towards the os pubis, it should be turned towards the coccyx, to prevent an obstacle. Then, the orifice must be dilated with the fingers, and the woman's throws should assist the midwife's efforts to educe the child. If the chin is embarrassed, the midwife must disengage it, by putting her finger into the mouth, in order to turn it to advantage.

If the infants head presents across, (ibid. n° 3.) it must be put back, and gently turned to its natural situation; and if the shoulder presents, the same art must be used (ibid. n° 4.) If the belly, hip, or thigh, appears first, (ibid. n° 5.) the child must be extracted by the feet, and the mother must lie horizontally on her back. If one or both hands are directed upwards, and lie close to the head, (ibid. n° 6.) the case is not so bad as some apprehend, for they will keep the orifice equally dilated, till the head passes, and prevents strangling. If one hand, or one foot appears, they must be returned, and the infant brought forth by the head in the former case, and by the feet in the latter. (n° 7, and 8.)

If the infant is dead, there is generally a collapsion of the abdomen; the breasts are flaccid; the infant bears on the lower part of the pelvis, and the child, upon motion, rolls like a lump of lead. The bones of the skull are wrapped over one another; an ichorous lymphatic sanies flows from the uterus; the mother is subject to fainting. There is no pulsation in the navel-string; it is soft and indolent to the touch, and absolutely deprived of motion. If the placenta comes first, and is hot, the child is alive. Above all, if any part of the infant's body appears, and is full of small vesicles livid, soft, and brittle, it is not only dead, but beginning to putrify. In these cases he must be extracted by the feet, and if it cannot be done otherwise, with an instrument; but a man midwife's assistance must not be neglected.

When the fœtus dies before the time of birth, and the membranes continue whole it will not putrify: therefore the work must be left to nature, for birth-pains will at length come on spontaneously.

If the navel-string appears first, and is compressed soon after by the head of the infant, its life is in danger, and the remedy is to return the infant, and reduce the cord, till the head fills the orifice: but if this cannot be done, the woman must



T. Jefferys sculp.

muſt be put in a ſuitable poſture, and the child muſt be extracted by the feet. When the placenta preſents itſelf, which is known by its ſpungy, ſoft, texture, and the great quantity of blood flowing at the ſame time, it requires ſpeedy aſſiſtance. If the membranes are entire, they ſhould be broke; the placenta and membranes ſhould be reduced into the uterus, and the child be extracted by the feet; which is more eaſily performed in the membranes, than in the uterus, and put into a proper ſituation: but if the placenta is diſengaged from its membranes, and theſe are broke, and the placenta, or both, appear before the infant, they may be brought away firſt, and the infant immediately afterwards.

When there is a great flux of blood from outward accidents, the infant ſhould be immediately delivered by art, though the mother is not in true labour. If the uterus is opened, and the vagina relaxed, as in this caſe they commonly are, the child muſt be extracted by the feet; if not, they muſt be mollified with freſh oil, and the infant delivered as before.

After all laborious births, the woman is generally weak, and apt to faint: therefore, her ſpirits ſhould be kept up by a glaſs of hot wine, or analeptic water, which muſt be repeated as oft as there is occaſion.

If after the child is born, the placenta does not ſoon follow, and it adheres to the womb, the woman is not to change her poſture immediately, but the midwife's hand is to be introduced into the womb, as far as the placenta, taking the navel-ſtring for a guide; and taking hold of it, ſhe is to move it gently to and fro, in order to looſen and extract it. ibid. n° 9. If it adheres too cloſely, it is not to be pulled forcibly, or broken: it will be beſt to wait half an hour, keeping the hand in the uterus, for fear of its cloſing, till it comes away of itſelf, or may be ſeparated without force. If, through the unſkilfulneſs of the midwiſe, the orifice of the womb cloſes, before it is come away, aloetic pills muſt be taken every evening. If it putrifies, the patient dies, or falls into dangerous fevers. See the article PLACENTA.

After delivery, the woman ſhould be put into bed, and a folded ſheet put under her hips, in order to receive the lochia. See the article LOCHIA.

Warm linen ſhould be applied to the genital parts, to keep out the air, and a compreſs, dipped in warm wine, ſhould be applied to the belly, but not too tight.

If there are violent pains after delivery, they generally proceed from the afterbirth's being retained, or part of it; from blood clotted, or concreted, in the uterus; from hard labour; from a defect in the flux of the lochia; or from wind, eſpecially if the woman has not been ſwathed in a proper way. In this caſe, hot diluents are proper, or an infuſion of camomile flowers, drank as tea, or broths with caraway ſeeds; or wormwood, or camomile flowers; or thin orange peel ʒj. or a bitter tincture in a proper infuſion, taken hot. An ounce or two of oil of ſweet almonds, taken in a hot vehicle, is excellent.

DELLY, the capital of a province of the ſame name, and at preſent of all the hither India: eaſt long. 79°. and north lat. 28°.

It is a large and populous city, ten miles in circumference.

DELOS, the principal of the Cyclades-iſlands, in the Archipelago: eaſt long. 25° 50′, and north lat. 37° 26′.

DELPHIN, or DOLPHIN. See the article DOLPHIN.

DELPHINIUM, LARK SPUR, in botany, a genus of the polyandria-trigynia claſs of plants, the corolla of which conſiſts of five unequal petals, diſpoſed circularly; of theſe the upper one is anteriorly more obtuſe than the others, and is emarginated, and extended behind into a tubulated horn, which is ſtraight, long, and obtuſe; the others are of an ovato-lanceolated figure, patent and nearly equal: the fruit conſiſts of one or three capſules, of an ovato-ſubulated figure, ſtraight, compoſed of a ſingle valve, and opening inwards: the ſeeds are numerous and angular: theſe ſeeds called ſtaphiſagria, or ſtaveſacre, in the ſhops, are uſed to deſtroy vermin in childrens heads. See plate LXIX. fig. 1.

DELPHINUS, in ichthyology, a genus of fiſhes, of the order of the plagiuri, the characters of which are, that they have teeth in each jaw, that the fiſtula is ſituated in the middle of the head, and that the back is pinnated, or furniſhed with fins.

To this genus belong the dolphin, the porpeſſe, and the grampus, or north caper. See the articles DOLPHIN, &c.

DELPHINUS, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars

ftars in Ptolemy's and Tycho's catalogues are ten, and in Mr. Flamfteed's eighteen.

DELTOIDES, in anatomy, a thick triangular mufcle of the arm, being one of the three elevators. See the article ELEVATOR.

This mufcle arifes from the clavicle, and the acromion and fpine of the fcapula; and terminates, at four fingers breadth below the neck of the humerus. See the article HUMERUS.

DELUGE, *diluvium*, an inundation, or overflowing of the earth, either wholly, or in part, by water.

We have feveral deluges recorded in hiftory, as that of Ogyges, which overflowed almoft all Attica, and that of Deucalion, which drowned all Theffaly, in Greece: but the moft memorable was that called the univerfal deluge, or Noah's flood, which overflowed and deftroyed the whole earth, and out of which only Noah, and thofe with him in the ark, efcaped.

Men have been very folicitous to account for this cataftrophe philofophically, and to difcover from whence fuch an amazing quantity of waters could come, as were neceffary to cover all our globe, to the height of fifteen cubits, above the higheft hills: for to that height Mofes exprefsly faith, *Gen.* vii. 20. "the waters "prevailed." Some have ventured to deny there were any mountains at all before the flood, though he exprefsly mentions them as a ftandard for the height of the waters. Others have denied the univerfality of the deluge, though the words of the text be, "That all "the hills over the whole earth were "covered." Others have had recourfe to the fhifting of the earth's center of gravity, and therefore, will have all parts drowned fucceffively; and our famous theorift, Dr. Burnet, fancies an earth made on purpofe to be drowned at that time, which being in form of an orbicular cruft on the face of the fea, as we now call it (for he fays, there was none before the deluge) fell down into the water, and fo drowned its inhabitants.

But the holy fcriptures tell us, that the waters of the deluge came from two funds, "the great deep below," and the "rains above." Again, when we look to the internal parts of the earth, even to the greateft depth men have ever reached, we find that the body of the terreftrial globe is compofed of ftrata, or layers, lying over one another, which appear to be fediments of a flood: befides, in the bodies of thefe ftrata, though never fo folid, nay, even inclofed within the folidity of the firmeft flints, marble, ftone, &c. we find a prodigious variety of the exuviæ, or remains of fifhes, fuch as their fhells, teeth, &c. as well marine ones, as thofe which live in lakes and rivers; and from a due obfervation of thefe, and repeated confiderations upon them, it was, that the learned Dr. Woodward founded what he delivers upon this fubject, which therefore is not fo much a theory of the earth, as neceffary deductions, and unavoidable confequences, drawn from the matters of fact, as they are laid down in the fecond part of his natural hiftory of the earth.

1. That thefe marine bodies, and the other fpoils of frefh-water fifhes, were borne forth out of the fea by the univerfal deluge, and on return of the water back again from off the earth, they were left behind on land.

2. That during the time of the deluge, all the ftone and marble of the antediluvian earth, all the metals in it, all the mineral concretions, and in a word, all foffils whatever, that had before attained any folidity, were totally diffolved; their conftituent corpufcles disjoined, and their cohefion perfectly ceafed; and that the faid corpufcles, together with the corpufcles of thofe which were not before folid, fuch as fand, earth, and the like; as alfo, all animal bodies, teeth, fhells, vegetables, in fhort, all bodies whatever, that were either upon the earth, or that conftituted the mafs, if not quite down to the abyfs, yet to the greateft depths we ever dig, were affumed up promifcuoufly into the water, and fuftained therein; fo that the water and thefe bodies made up one common mafs.

3. That at length, all the mafs that was thus borne up in the water, was again precipitated, and fubfided toward the bottom, and that this fubfidence happened generally according to the laws of gravity. See the article GRAVITY.

That the matter fubfiding thus, formed the ftrata of ftone, earth, marble, coal, &c. of which ftrata the terreftrial globe, or, at leaft, as much of it as hath been difplayed to human view, doth mainly confift.

4. That the ftrata of marble, &c. attained their folidity as foon as the fand, or

or other matter, whereof they consist, was arrived at the bottom, and well settled there; and that all those strata which are solid at this day, have been so ever since that time.

5. That these strata were originally parallel, plane, and regular, and consequently rendered the surface of the earth even and spherical; that they were contiguous, and not broken and interrupted as we find them now; and that the water lay then upon them, constituting a fluid sphere, inviorning all the globe round.

6. That after some time, by the force of an agent seated within the earth, those strata were broken on all sides of the globe; that they were dislocated, and their situation varied; from whence these elevations and depressions on the surface of the globe, as the mountains, vallies, and other inequalities.

And afterwards, he concludes from his observations,

1. That Noah's deluge was quite universal, covering the whole earth, even the highest mountains quite round the globe.

2. That, at the time of the deluge, the water of the ocean was first brought out on the earth, and immediately succeeded by that of the abyss.

3. That, upon the disruption of the strata, or the elevation of some, and the depression of others, towards the end of the deluge, this mass of water fell back towards the lowest parts of the earth, into lakes, and other cavities, into the channel of the ocean, and through the fissures, by which this communicates with the ocean, in the abyss which it filled, till it came to an equilibrium with the ocean.

4. That the deluge commenced in the spring season, the waters coming forth upon the earth in the month which we call May.

5. That the deluge did not happen, from an accidental concourse of natural causes; but that many things then happened, which never could possibly happen, without the assistance of a supernatural power.

Mr. Whiston, on the contrary, in his new theory of the earth, supposes the deluge began on the 18th of November, in the 2365 year of the Julian period, that is, 2349 years before the Christian æra; that a comet descending towards its perihelion, in the plane of the ecliptic, passed quite near the globe of the earth, the very same day that the deluge began: he ascribes to the universal deluge all the changes and alterations that have happened in the surface and inside of the globe: he adopts the hypothesis of Dr. Woodward, and indiscriminately makes use of all the observations of this author, with regard to the present state of the globe.

The terrestrial globe having once met with the tail of the comet, consisting of a transparent fog, or aqueous atmosphere, it must, in passing through it, appropriate to itself some part of the matter it contained. All that was found within the sphere of attraction of the globe, must have fallen upon the earth, and that in form of rain, since this tail partly consisted of aqueous vapours. This tail being "the cataracts of heaven that were "opened," the rain may be made as plentiful as one pleases, even to occasion an universal deluge, the waters of which would easily cover the highest mountains. However, Mr. Whiston does not attribute the whole deluge to these waters only, for, agreeable to scripture, he affirms that the earth, upon the approach of the comet, would no doubt feel the force of its attraction; so that the fluid, contained in the great abyss, would be agitated by so violent a flux and reflux, that the superficial crust of the earth could not resist it, but be broken in several places, and the internal waters diffused over the surface, "and the foun-"tains of the great deep broken up."

Mr. Whiston, to dispose of all this water, supposes, that as soon as the earth in continuing its course, had got some way from the comet, the effects of its attraction, the flux and reflux ceased in the great abyss, and then the superior waters were violently precipitated through the same passages by which they came out; the great abyss swallowed up all the superfluous waters, and its cavity was found capable enough to receive not only the waters which it had already contained, but also all those which the tail of the comet had left behind it; since during the time of its agitation, and the bursting of its crust, it had enlarged the space by breaking down, on all hands, the earth that environed it. It was, in like manner at this time, that the earth, which till then was spherical, became elliptic, occasioned not only by the effect of the centrifugal force caused by its diurnal revolution, but likewise by the action,

action of the comet; and that becaufe the earth, in paffing through the tail of the comet, was fituated in fuch a manner, that it prefented its equatorial parts to this body; and becaufe the force of the comet's attraction, concurring with this centrifugal force of the earth, took away thofe parts of the equator with fo much the more facility, as the cruft was broken and disjoined in a vaft many places; and becaufe the action of the flux and reflux of the abyfs made a more violent impreffion upon the parts under the equator, than any where elfe.

Dr. Halley refolves the deluge into the fhock of a comet, or fome other fuch tranfient body; the great agitation that muft have been occafioned by it in the fea, he obferves, would be fufficient to account for all thofe ftrange appearances of heaping vaft quantities of earth, and high cliffs upon the beds of fhells, which once were the bottom of the fea, and raifing up mountains, where none were before: fuch a fhock as this, impelling the folid parts, would occafion the waters, and all fluid fubftances that were unconfined, as the fea is, to run violently with an impetus toward that part of the globe where the blow was received, and that with force fufficient to take with it the very bottom of the ocean, and would carry it upon land.

There are various other fyftems of the univerfal deluge, feveral of which may be feen in Monf. Buffon's Natural Hiftory, Tom. I.

DEMAIN, or Demesne, in its common acceptation, is ufed for the lands round a manor-houfe, occupied by the lord. See the article Manor.

Demain, or Demesne, in law, is commonly underftood to be the lord's chief manor-place, with the lands thereto belonging, which he and his anceftors have time out of mind kept in their own manual occupation, for the maintenance of themfelves and their families. See the article Manor.

Demain denotes alfo all the parts of any manor not in the hands of freeholders. And it is frequently ufed for a diftinction between thefe lands, &c. that the lord of the manor has in his own hands, or of his leffee demifed at a rack rent; or fuch other land appertaining to the manor, which belongs to free or copyholders.

Demain is fometimes taken in a more fpecial fenfe, as oppofite to frank-fee; fuch lands as were in the poffeffion of Edward the confeffor, being called antient demefne, and all others frank-fee. In England, no private perfon has any demefnes, according to the fimple acceptation of the word, becaufe there is no land but what depends mediately or immediately upon the crown, as of fome honour belonging to it, and not granted in fee to any inferior perfon; wherefore when a perfon in pleading would fignify the land to be his own, he fays, that he is feized thereof in his demain as of fee; by which it appears, that tho' his land be to him and his heirs for ever, yet it is not true demefne, but depending upon a fuperior lord, and is held by rent or fervice.

DEMAND, in law, the calling upon a perfon for any thing that is due.

There are two kinds of demands, the one in deed, and the other in law. And thefe are again divided into three forts, one in writing, without fpeaking, as in every writ of præcipe; one other without writing, being a verbal demand of the perfon who is to perform fomething; and another made without either word or writing, which is termed a demand in law, as in cafes of entries on lands, &c. And, as an entry upon land and taking diftrefs for rent, are a demand in law of the land and rent, fo the bringing an action of debt for money due on a bond, is a demand in law of the debt.

A demand is to be legal, and made in fuch a manner as the law directs; if for rent referved on a leafe of a meffuage and lands, it ought to be made at the fore door of the houfe; and of land, on the moft public part thereof. If a leffor or landlord in demanding of rent to re-enter, demands one penny more or lefs than is actually due to him, or does not fhew the certainty of the rent, the day of its payment, and when due, it will not be a good demand. Debts and claims are to be demanded in time by the ftatute of limitations, or they will be loft by law.

DEMANDANT, in law, is the plaintiff in all real actions, wherein land, &c. is demanded; for thefe actions are by demands, as perfonal actions are by plaints.

DEMARCHUS, δήμαρχος, in antiquity, the principal magiftrate of the city Neapolis; alfo a magiftrate who had the government of one of the diftricts of Attica, anfwering in fome meafure to our fheriffs.

DEMEMBRE', in heraldry, is faid of difmembred animals, or thofe with their limbs cut off.

DEMER,

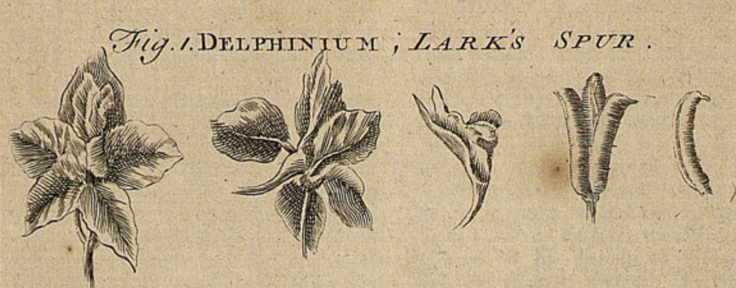


Fig. 1. DELPHINIUM; *LARK'S SPUR.*



Fig. 2 DERMESTES.

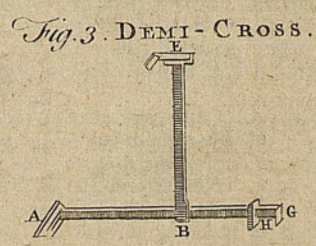


Fig. 3. DEMI-CROSS.

Fig. 4. DENTALIA.

Fig. 5. DESIGNING.

Fig. 6. DENTARIA, *or TOOTH-WORT.*

J. Jefferys sculp.

DEMER, a river in the Austrian Netherlands, on which the city of Mechlin stands.

DEMESNE, the same with demain. See the article DEMAIN.

DEMETRIA, a festival celebrated by the Greeks in honour of Ceres, called Δημήτηρ; wherein it was usual for the devotees to lash themselves.

DEMETRIOWITZ, a city of the dutchy of Smolensko, in the russian empire, situated upon the river Ugra, in 37° east long. and 52° 30′ north lat.

DEMI, a word used in composition with other words to signify half. In words borrowed from the Latin we use semi. See the article SEMI.

DEMI-BASTION, a fortification having only one face and one flank. See BASTION.

DEMI-CANNON *lowest*, the name of a piece of ordnance generally about six inches bore, 5400 pound weight, ten or eleven feet long, and carrying a shot of about thirty pound weight. It carries point blank 156 paces.

DEMI-CANNON *ordinary*, is 6½ inches bore, 12 feet long, and weighs 5600 pound. It carries a shot of 6 ⅛ inches in diameter, whose weight is 32 pounds, and shoots point blank 162 paces.

DEMI CANNON *of the longest size*, is 6¾ inches bore, 12 feet long, and weighs 6000 pounds weight. It shoots point blank 180 paces.

DEMI-CROSS, an instrument used by the Dutch to take the sun's altitude, or that of a star, at sea. It consists of a staff AG (See plate LXIX. fig. 3.) divided into a line of tangents, and a cross piece or transum B E. It is furnished with three vanes; a horizon vane, at A; a sight vane, at H; and the shade vane, at E.

To take the sun's altitude by this instrument, hold it with the cross piece B E as upright as you can; and looking thro' the sight vane at H, observe the horizon thro' the slit in the horizon vane A, and slide the cross piece to and fro till the shade of the vane at E fall likewise upon the slit of the horizon vane A; then are the degrees cut on the staff A G, by the edge of the cross piece B E, the altitude of the sun required. But to find the height of a star, you must remove the horizon vane A, and put it on the end G, and transfer the sight vane H to A; then holding the instrument upright, as before, observe the horizon through the sight vane and horizon vane, and the star through the sight vane and shade vane, and then the transum will cut the degrees of the star's altitude on the staff A G; allowing about eight or ten minutes for your height above the level of the water. Instead of the demi-cross, we use the cross staff or fore-staff. See FORE-STAFF.

DEMI-CULVERIN, a piece of ordnance usually 4½ inches bore, 2700 pound weight, ten feet long, and carrying point blank 175 paces.

DEMI-CULVERIN *of the least size*, is 4¼ inches bore, 10 feet long, and 2000 pounds weight. It carries a ball of 4 inches diameter, and of 9 pounds weight, and its level range is 174 paces.

DEMI-CULVERIN *of the largest sort*, is 4¾ inches bore, 10⅓ feet long, and weighs 3000 pounds weight. It carries a ball 4½ inches diameter, weighing 12 pounds 11 ounces, point blank 178 paces.

DEMIDITONE, in music, is the same with a third minor. See the article THIRD.

DEMI-HAQUE. See HARQUEBUSS.

DEMI-GOD, &c. See GOD, HERO, &c.

DEMI-GORGE, in fortification, is that part of the polygon which remains after the flank is raised, and goes from the curtin to the angle of the polygon. It is half of the vacant space or entrance into a bastion. See the article GORGE.

DEMI-LUNE, *half moon*, in fortification, an outwork consisting of two faces and two little flanks, frequently built before the angle of a bastion, and sometimes also before the curtin, tho' now much disused.

DEMI-QUAVER, a note in music, two of which are equal to a quaver. See the article QUAVER.

DEMI-SEMI-QUAVER, in music, the shortest note, two of them being equal to a semi-quaver.

DEMI-VOLT, in the manege. See the article VOLT.

DEMISE, in law, is applied to an estate either in fee, for term of life or years, tho' most usually the latter. The king's death in law is termed the demise of the king, which does not discontinue any writ or process, nor determine any commission civil or military, nor a parliament till after six months.

DEMISE and REDEMISE, a conveyance where there are mutual leases made from one to another of the same land, or something out of it.

DEMOCRACY, the same with a popular government, wherein the supreme power is lodged in the hands of the people: such were Rome and Athens of old; but as to our modern republics, Basil only excepted,

excepted, their government comes nearer to ariftocracy than democracy.

DEMOISELLE, in ornithology, a bird of the crane-kind, fomething lefs than a heron, known alfo by the name of the dancing bird, on account of its frequent leaping and turning round, and varying the motion of its head at the fame time. Immediately from behind each eye, fprings forth a tuft of long, foft, white feathers, which tend backwards in a very graceful manner, and wave with the leaft air. The fore part of the neck, on the contrary, is covered with foft, long, and flender black feathers, which fall on the breaft in a very pretty manner, fometimes clofe, and at other times detached like a lady's tippet.

DEMONSTRABLE, a term ufed in the fchools, to fignify that a thing may be clearly proved. Thus it is demonftrable that the three angles of a triangle, are equal to two right ones.

DEMONSTRATION, in logic, a feries of fyllogyfms, all whofe premiffes are either definitions, felf-evident truths, or propofitions already eftablifhed.

The knowledge acquired by demonftration, tho' it be certain, is not fo clear and evident as intuitive knowledge. It requires pains and attention, and fteady application of mind, to difcover the agreement or difagreement of the ideas it confiders; and there muft be a progreffion by fteps and degrees, before the mind can in this way arrive at certainty. Before demonftration there was a doubt, which, in intuitive knowledge, cannot happen to the mind that has its faculty of perception left to a degree capable of diftinct ideas. In every ftep that reafon makes in demonftrative knowledge, there is an intuitive knowledge of that agreement or difagreement it feeks with the next intermediate idea, which it ufes as a proof; for if it were not fo, that yet would need a proof, fince without the perception of fuch agreement or difagreement, there is no knowledge produced. This intuitive perception of the agreement or difagreement of the intermediate ideas in each ftep and progreffion of the demonftration, muft be exactly carried in the mind; and a man muft be fure that no part is left out: hence becaufe in long deductions the memory cannot eafily retain each ftep, this knowledge becomes more imperfect than intuitive; and men often embrace falfhoods for demonftrations. See KNOWLEDGE and INTUITION.

It has been generally taken for granted, that mathematics alone are capable of demonftration. But to have fuch an agreement or difagreement as may be intuitively perceived being not the privilege of the ideas of number, extenfion and figure alone, it may poffibly be the want of due method and application in us, and not of fufficient evidence in things, that demonftration has been thought to have fo little to do in other parts of knowledge. For wherever the mind can perceive the agreement or difagreement of any two ideas by an intuitive perception of the agreement or difagreement they have with any intermediate ideas, there the mind is capable of demonftration, which is not limited to the ideas of figure, number, extenfion, or their modes. There are two things required in right demonftration, firft, that every propofition of which it confifts, confidered feparately, be true. Secondly, that the confequence drawn from other foreign things, neceffarily flow from them; or that all the confequences be contained in the antecedents or premifes.

Demonftration is diftinguifhed, 1. Into direct, called alfo oftenfive demonftration, when beginning with definitions, felf-evident propofitions, or known and allowed truths, we form a train of fyllogifms, and combine them in an orderly manner, continuing the feries thro' a variety of fucceffive fteps, until at laft we arrive at a fyllogifm, whofe conclufion is the propofition to be demonftrated. 2. Indirect, or, as it is fometimes called, apogogical demonftration, when we affume a propofition which directly contradicts that we mean to demonftrate; and thence by a continued train of reafoning, in the way of a direct demonftration, deduce fome abfurdity or manifeft untruth. For hereupon we conclude, that the propofition affumed was falfe; and thence again, by an immediate confequence, that the propofition to be demonftrated is true. Thus Euclid being to demonftrate, *that circles which touch one another inwardly have not the fame center*, affumes the direct contrary to this, *viz. that they have the fame center*: and thence by an evident train of reafoning proves, *that a part is equal to the whole*. The fuppofition, therefore, leading to this abfurdity he concludes to be falfe, *that circles touching one another inwardly have the fame center*; and thence again immediately infers *that they have not*

not the same center. This is also called *reductio ad impossibile,* and *ad absurdum.* 3. Geometrical demonstration, that framed of reasonings drawn from the elements of Euclid. 4. Mechanical demonstration, that, the reasonings of which are drawn from the rules of mechanics. 5. Demonstration a priori, that by which the effect is demonstrated from its cause either next or remote, as when we prove the existence of light by the existence of the sun. 6. Demonstration a posteriori, when we demonstrate the cause from the effect; as when from the existence of light, we demonstrate the existence of the sun.

The schoolmen make two kinds of demonstration, the one διότι, or *propter quod,* in which an effect is proved by the next cause. As when it is proved that the moon is eclipsed, on account of the interposition of the earth between the sun and moon. The other ὅτι, or *quia,* wherein the cause is proved from an effect, as, that fire is hot because it burns; or when an effect is demonstrated by a remote cause, as when it is proved that plants do not breathe, because they are not animals,

DEMONSTRATIVE, in rhetoric, one of the kinds of eloquence, *viz.* that which obtains in the composition of panegyrics, invectives, *&c.* See the article RHETORIC.

DEMONSTRATIVE, in grammar, a term given to such pronouns, as serve to indidate or point out a thing. Of this number are *hic, hæc, hoc,* among the Latins; and *this, that, these, those,* in English. See the article PRONOUN.

DEMULCENTS, among physicians, medicines good against acrimonious humours. Such are the roots of marsh-mallows, of white lilies, of liquorice, and of viper grass, the five emollient herbs, *&c.* See the article EMOLLIENTS.

DEMURRAGE, in commerce, an allowance made to the master of a ship by the merchants, for staying in a port longer than the time first appointed for his departure.

DEMURRER, in law, a stop put to any action upon some point of difficulty which must be determined by the court, before any further proceedings can be had in the suit. Demurrers are either general, without shewing any particular cause; or special, where the causes of it are particularly assigned; and one may not pray the judgment of the court on an insufficient declaration or plea, otherwise than by demurrer, when the matter comes judicially before them. In pleadings, if a matter is insufficiently alledged, that the court cannot give judgment thereon, a general demurrer will suffice, and so for want of substance in any plea, *&c.* But if there be a want of form, it is required that there be a special demurrer.

DEMURRER *to evidence,* is where a question of law arises thereon, as if the plaintiff in a suit gives in evidence any records, deeds, writings, *&c.* upon which a law question arises, and the defendant offers to demur upon it, then the plaintiff must join in such demurrer, or wave his evidence.

DEMURRER *to indictments,* is when a criminal joins issue upon a point of law in an indictment or appeal, allowing the fact as laid to be true. And if the indictment, or appeal, prove good in the opinion of the judges by whom the demurrer is to be tried, and not by the inquest, they proceed to judgment and execution, as if the party had been convicted by confession or verdict.

DEN, a syllable which added to the names of places shews them to be situated in vallies or near woods, as Tenterden.

DEN and STROND, in law, was antiently a liberty for ships to run or come ashore.

DENARIATE of LAND, *denariatus terræ,* in old law-books, signifies as much as was worth a penny by the year.

DENARIUS, in roman antiquity, the chief silver-coin among the Romans, worth in our money about seven-pence three farthings. As a weight, it was the seventh part of a roman ounce. See the articles COIN and WEIGHT.

DENARIUS DEI, GOD'S PENNY, denotes earnest-money, and is so called because in antient times it was given to the church or the poor.

DENARIUS *tertius comitatus,* a third part of the profits of county-courts. When these courts had superior jurisdictions, before others were erected, two parts of the profits went to the king, and a third part to the earl of the county.

DENARII *de caritate,* were customary oblations made to cathedral churches charged upon parish priests, though at first they were but a gift of charity.

DENBY, the capital of Denbighshire, in north Wales: west long. 3° 30′, and north lat. 53° 15′.

It sends only one member to parliament.

DENDERMOND, a fortified town of Flanders,

ders, situated at the confluence of the rivers Scheld and Dender, twelve miles east of Ghent: east long. 3° 50′, and north lat. 51° 10′.

DENDRACHATES, in natural history, the name used by the antients for an extremely elegant and beautiful species of agat, the ground of which is whitish, variegated with veins of a brighter white. These veins are beautifully disposed in a number of various figures, but generally in many concentric irregular circles, drawn round one or more points. It is common also, in various parts of this stone, to find very beautiful delineations of trees, mosses, sea-plants, and the like, so elegantly expressed, that many have erroneously taken them for real plants included in the substance of the stone; whence the name dendrachates. See the article AGAT.

DENDRANATOMY, a term used by some for a description of the various parts of trees, as root, trunk, branch, bark, wood, pith, flower, fruit, *&c.* See the articles ROOT, TRUNK, BRANCH, *&c.*

DENDROPHORIA, in antiquity, the carrying of boughs or branches of trees, a religious ceremony so called, because certain priests called from thence dendrophori, tree-bearers, marched in procession, carrying the branches of trees in their hands in honour of some god, as Bacchus, Cybele, Sylvanus, *&c.* The college of the dendrophori is often mentioned in antient marbles; and we frequently see in basso relievos the bacchanals represented as men carrying little shrubs or branches of trees.

Critics are at a loss to assign the office of the dendrophori who attended the roman army. Some hold that they fashioned the wood for the tents; others, that they provided the wood necessary for the machines of war; and others, that they were the same with the dendrophori of the feasts and sacrifices.

DENEB, an arabic term signifying tail, used by astronomers to denote several fixed stars. Thus deneb elecet, signifies the bright star in the lion's tail. Deneb adigege, that in the swan's tail, *&c.*

DENIER, a small french copper-coin, of which twelve make a sol.

There were two kinds of deniers, the one tournois, the other parisis, whereof the latter was worth a fourth part more than the former. See the article COIN.

DENIZEN, in law, an alien made a subject by the king's letters patent, otherwise called donaison, because his legitimation proceeds *ex donatione regis*, from the king's gift. A denizen is enabled in several respects to act as natural subjects do, *viz.* to purchase and possess lands, and enjoy any office or dignity; yet it is short of naturalization, for a stranger, when naturalized, may inherit lands by descent, which a denizen cannot do. If a denizen purchase lands, his issue that are born afterwards may inherit them, but those he had before shall not; and as a denizen may purchase, so he may take lands by devise.

DENMARK, a kingdom situated between 8° and 13° of east longitude, and between 54° and 58° of north latitude: it comprehends the peninsula of Jutland, and the islands of Zeland, Funen, *&c.* To the king of Denmark likewise belong Norway, Iceland, and the dutchy of Holstein.

DENNIS, or St. DENNIS, a town of France four miles north of Paris, where the kings of France are interred.

DENOMINATION, a name imposed on any thing, usually expressing some predominant quality. Hence, as the qualities and forms of things are either internal or external, denomination becomes, 1. Internal, which is that founded on the intrinsic form. Thus Peter is denominated learned, on account of his learning, which is something internal. 2. External denomination, that founded on an external form. Thus, a wall is said to be seen and known, from the vision and cognition employed upon it. And thus, Peter is denominated honoured by reason of honour, which is not so much in the person honoured, as in him who honours.

DENOMINATOR, in arithmetic, a term used in speaking of fractions.

The denominator of a fraction is the number below the line, shewing into how many parts the integer is supposed to be divided. Thus in the fraction $\frac{3}{4}$, the number 4 shews that the integer is divided into four parts. So in the fraction $\frac{a}{b}$, b is the denominator. See the article FRACTION.

DENOMINATOR *of a ratio*, is the quotient arising from the division of the antecedent by the consequent. Thus 8 is the denominator of the ratio 40 : 5, because 40 divided by 5, gives 8 for a quotient. It is also called the exponent of a ratio. See the article EXPONENT.

DE NON RESIDENTIA CLERICI REGIS, a writ that lies where a perſon is employed in the king's ſervice, in order to excuſe him of non-reſidence upon his living.

DENS, TOOTH, in anatomy. See the article TOOTH.

DENSHRING, or DEVENSHRING, in huſbandry. See DEVENSHRING.

DENSITY *of bodies*, is that property directly oppoſite to rarity, whereby they contain ſuch a quantity of matter under ſuch a bulk.

Accordingly, a body is ſaid to have double or triple the denſity of another body, when their bulk being equal, the quantity of matter is in the one double or triple the quantity of matter in the other. The denſities and bulks of bodies, are the two great points upon which all mechanics or laws of motion turn. It is an axiom that bodies of the ſame denſity contain equal maſſes under equal bulks. If the bulks of two bodies be equal, their denſities are as their maſſes: conſequently, the denſities of equal bodies are as their gravities. If two bodies have the ſame denſity, their maſſes are as their bulks; and as their gravity is as their maſſes, the gravity of bodies of the ſame denſity is in the ratio of their bulk. Hence alſo bodies of the ſame denſity are of the ſame ſpecific gravity; and bodies of different denſity, of different ſpecific gravity. The quantities of matter in two bodies, are in a ratio compounded of their denſity and bulk: conſequently their gravity is in the ſame ratio. If the maſſes or gravities of two bodies be equal, the denſities are reciprocally as their bulks. The denſities of any two bodies are in a ratio compounded of the direct ratio of their maſſes, and a reciprocal one of their bulks: conſequently ſince the gravity of bodies is as their maſſes, the denſities of bodies are in a ratio compounded of the direct ratio of their gravities, and a reciprocal one of their bulks. See the method of finding the ſpecific gravities, and conſequently the denſities, of both ſolid and fluid bodies, and likewiſe a table of the ſpecific gravities of bodies, under the articles HYDROSTATICAL BALLANCE, and *Specific* GRAVITY.

DENSITY *of the air*, is a property that has employed the later philoſophers ſince the diſcovery of the toricellian experiment.

It is demonſtrated, that in the ſame veſſel, or even in veſſels communicating with each other at the ſame diſtance from the center, the air has every where the ſame denſity. The denſity of the air, *cæteris paribus*, increaſes in proportion to the compreſſing powers. Hence the inferior air is denſer than the ſuperior; the denſity, however, of the lower air, is not proportional to the weight of the atmoſphere on account of heat and cold, and other cauſes perhaps which make great alterations in denſity and rarity. However, from the elaſticity of the air, its denſity muſt be always different at different heights from the earth's ſurface; for the lower parts being preſſed by the weight of thoſe above, will be made to accede nearer to each other, and the more ſo as the weight of the incumbent air is greater. Hence, the denſity of the air is greateſt at the earth's ſurface, and decreaſes upwards in geometrical proportion to the altitudes taken in arithmetical progreſſion.

If the air be rendered denſer, the weight of bodies in it is diminiſhed; if rarer, increaſed, becauſe bodies loſe a greater part of their weight in denſer than in rarer mediums. Hence, if the denſity of the air be ſenſibly altered, bodies equally heavy in a rarer air, if their ſpecific gravities be conſiderably different, will loſe their equilibrium in the denſer, and the ſpecifically heavier body will preponderate. See the articles AIR and CONDENSER.

DENSITY *of the planets*. In homogeneous, unequal ſpherical bodies, the gravities on their ſurfaces are as the diameters, if the denſities are equal. But if the bodies be equal, the gravities will be as the denſities. Therefore, in bodies of unequal bulks and denſities, the gravity will be in a compound ratio of the diameters and denſities. Conſequently, the denſities will be as the gravities divided by the diameters, and therefore in the ſeveral bodies as follows, *viz.*

In the Sun.	Jupiter.	Saturn.	Earth.	Moon.
10000.	9385.	6567.	39539.	48911.

As it is not likely that theſe bodies are homogeneal, the denſities here determined are not to be ſuppoſed the true, but rather the mean denſities, or ſuch as the bodies would have if they were homogeneal, and of the ſame maſs of matter, and magnitude.

DENTALIUM, in natural hiſtory, a ſimple ſhell having no hinge, and formed only of one piece: it is of a figure approaching to cylindric or conic, and is ſometimes crooked, ſometimes ſtraight; ſometimes

times closed at one end, sometimes open at both.

The name dentalium has been given this shell, from the great resemblance it has to the dentes canini of quadrupeds. There are several species of it, frequent on the shores of Italy, Portugal, &c. Among us, they are found fossile in clay-pits, some smooth, some striated; but in much greater abundance in the mountains of France and Italy. See plate LXIX. fig. 4.

The true officinal dentalium is one of the canales, or tubuli marini simplices, of authors: and the animal that inhabits it is of the genus of the nereis of Linnæus. See the article NEREIS.

Great things have been recorded of the virtues of the dentalium, but it has in reality no other than those of an alkali or absorbent, so that the readiness of oyster-shells has now put it out of use.

DENTARIA, TOOTHWORT, in botany, a genus of the tetradynamia-siliquosa class of plants, the corolla of which is cruciform, and consists of four roundish, obtuse petals, slightly emarginated, plane, and ending in ungues of the length of the cup: the fruit is a long, roundish, bilocular pod, consisting of two valves: the seeds are numerous and roundish. See plate LXIX. fig. 6.

The root of this plant, the only part used in medicine, is accounted drying and astringent.

DENTATED LEAF, among botanists, one notched at the edges with a number of blunt points in some measure resembling teeth. See the article LEAF.

DENTED, or INDENTED. See the article INDENTED.

DENTEX, in ichthyology, a species of sparus, of a deep olive-brown colour, elegantly variegated with darker and paler spots: its back is acute or ridged, and it has four large teeth: it is a well tasted fish. See the article SPARUS.

DENTICLES, or DENTILS, in architecture, an ornament in corniches bearing some resemblance to teeth, particularly used in the ionic and corinthian orders. They are cut on a little square member, properly called denticulus, and the notches or ornaments themselves, dentils. In antient times dentils were never used in the ionic corniche, yet they are found in the remains of the theatre of Marcellus, which some take for an argument that Vitruvius had not the direction of that building. Vitruvius prescribes the breadth of each dentil to be half its height, and the indenture or interval between each two, he directs to be two thirds of the breadth of the dentil.

DENTIFORM PROCESS, in anatomy, See the article PYRENOIDES.

DENTIFRICE, in medicine, a remedy for rubbing the teeth, and purging them from sordes; and for cleansing and absterging the gums, when replete with humours. There are dentifrices of various kinds and forms, some in form of a powder composed of corals, pumice-stone, salt, allum, egg-shells, crabs-claws, hartshorn, &c. others in form of an electuary, consisting of the same powders mixt up with honey; others are in form of a liquor drawn by distillations from drying herbs, and astringent medicines, &c.

The generality of operators for the teeth allow acids, such as spirit of vitriol, &c. to be the readiest of all dentifrices, to take off the foulness and yellowness of the teeth: but yet, they don't advise a frequent use of these remedies, as they wear away too much of the teeth and injure the gums.

The Dutch account butter the best dentifrice for keeping the teeth white and sound, and the Spaniards hold urine to be good for that purpose.

DENTILS, in architecture, the same with denticles. See the article DENTICLES.

DENTISCALPRA, in surgery, an instrument for scouring yellow, livid, or black, teeth; to which being applied, near the gums, it scrapes off the foul, morbid crust.

Some of these instruments are furnished with narrow points; others with broader, and with edges; and some again are falciform; but all of them adapted to one and the same handle.

DENTITION, the breeding, or cutting, the teeth in children.

Among all the disorders which afflict children, there are none generate such grievous symptoms as difficult dentition. About five or six months after birth, the teeth generally begin to make their appearance: first, the incisores, or fore-teeth; next, the canini, or dog teeth; and, lastly, the molares, or grinders. About the seventh year there comes a new set; and at twenty one the two inner grinders, called *dentes sapientiæ*, or teeth of wisdom. At the time of cutting their teeth, they slaver very much, and have a diarrhœa, which is no bad sign: but

but when it is difficult, efpecially when the canine teeth begin to be in motion, and make their way out through the gums, the child has ftartings in his fleep, tumours of the gums, gripes, loofenefs or coftivenefs, greenifh ftools, the thrufh, fevers, difficult breathing, fuffocating catarrhs, convulfions, epilepfies, which often end in death.

It fhews the dentition is like to be bad, if the child is perpetually crying, thrufts his finger into his mouth, and bites the nurfe's nipples; if unequal tubercles are perceived in the gums, where the teeth are expected to appear; if there is a heat in the mouth, and the whole body; if they ftart without a caufe, efpecially in fleep.

Harris obferves, that when an inflammation appears, the phyficians will labour in vain, if the cure is not begun by applying a leech under each ear. When the fwelling of the gum fhews it is time to cut it, to make way for the tooth, he would have it done with a pen-knife, not with a fine lancet, left the wound fhould heal, and form a cicatrix. The food he directs to be no more that lukewarm.

Heifter advifes internally aqueous mixtures, temperating powders; externally, oil of fweet almonds, with fpirit of violets, or fpirit of wild poppies, lightly acidulated with fpirit of vitriol, wherewith often to rub the gums; as alfo with the coral, or other fmooth thing, which will have the fame effect. Some reckon the frefh blood of a cock's comb a fpecific for this purpofe. Morgan affirms, in this cafe, it will be beft to abate the effervefcence of the blood with diluters; to appeafe the pain with gentle opiates; to open the body with purges and clyfters; to draw off the fermented ferum by bliftersj; to promote the cutting of the teeth by cooling, relaxing, and opening the gums: for this purpofe diacodium is good, or a ftrong decoction of marfhmallows and poppy heads, in thick milk, cream, or neats-foot oil.

Sydenham obferves, that pains in dentition often produce fevers: for which he could find no remedy fo effectual as three or four drops of fpirit of hartfhorn in a fpoonful of fimple water, or other convenient vehicle, given every four hours: the number of dofes may be four, five, or fix.

DENUNCIATION, a folemn publication or promulgation of any thing.

All veffels of enemies are lawful prize, after denunciation or proclamation of war. The defign of the denunciation of excommunicated perfons, is that the fentence may be the more fully executed by the perfon's being more known.

DEOBSTRUENTS, in pharmacy, fuch medicines as open obftructions. See the article Detergent.

There is fomewhat further expreffed in the term deobftruent than in detergent, for a medicine may be deobftruent that is not, in the ftricteft fenfe, detergent; as are moft metalline fubftances, as fteel and mercury, which obtain the appellation deobftruents, from their acting by their natural weight, whereby they increafe the momentum of the circulating fluids, and with greater force make it ftrike againft the fecretory outlets: becaufe the momenta, or vis percuffionis, of all projectiles, of which kind is a circulating fluid, is as their folidities, fuppofing their velocities equal. The more, therefore, the animal fluids are faturated with denfe and folid particles, with the greater force they diftend the veffels, and the more eafily break through, where the ftructure favours their efcape; and upon that account are medicines, which add to thefe qualities in the fluid, called deobftruents.

DEODAND, in our cuftoms, implies a thing devoted or confecrated to God, for the pacification of his wrath, in cafe of any misfortune, as a perfon's coming to a violent end, without the fault of any reafonable creature; as if a horfe fhould ftrike his keeper, and fo kill him. In this cafe, the horfe is to be a deodand; that is, he is to be fold, and the price diftributed to the poor, as an expiation of that dreadful event.

DE ONERANDO pro rata portionis, in law, a writ that lies where a perfon is deftrained for rent, which ought to be paid by others in proportion with him; as where one holds twenty acres of land by fealty, at a certain rent, and aliens one acre to one perfon, and another to another: here, if one of the alienees be diftrained for the whole, or more rent than the value of what he purchafed, he then may have this writ.

DEOPPILATIVES, in pharmacy, the fame with deobftruents. See the article Deobstruents.

DEPART, in chemiftry, a method of refining

fining, or ſeparating gold from ſilver, by means of aquafortis, generally called quartation.

For the operation of the depart, ſee the articles ASSAYING and QUARTATION.

DEPARTURE, in law, ſignifies a departing or going from a plea given in bar of an action. It is likewiſe uſed where a plaintiff in his declaration ſets forth one thing, and after the defendant has pleaded thereto, he in his replication ſhews new matter different from his declaration.

If a perſon pleads a general agreement in bar, and alledges a ſpecial one in his rejoinder, this will be a departure in pleading: ſo, where an action is brought at common law, and the plaintiff, by his replication, endeavours to maintain it by cuſtom. It will alſo be accounted a departure, if, after performance is pleaded in debt upon hand, the defendant ſays any other thing, by way of excuſe, *&c.* But in circumſtances of time, &c. laid as to promiſes, if the defendant by his plea force the plaintiff to vary, it is no departure: for the plaintiff is not tied to a preciſe day.

DEPARTURE *in deſpite of the court*, is where a tenant or defendant appears to an action brought againſt him, and having a day over in the ſame term, does not appear at the day, but makes a default. This is a departure in deſpite of the court, and therefore he ſhall be condemned.

DEPARTURE, in navigation, is the eaſting or weſting of a ſhip in reſpect of the meridian it departed or failed from: or it is the difference of longitude, either eaſt or weſt, between the preſent meridian the ſhip is under, and that where the laſt reckoning or obſervation was made. This departure, any where but under the equator, muſt be accounted according to the number of miles in a degree, proper to the parallel the ſhip is under.

DEPHLEGMATED, an appellation given to ſpirits well freed from phlegm. See the next article.

DEPHLEGMATION, in chemiſtry, the ſame as rectification, or the freeing a ſpirit from its phlegm, either by diſtillation, or ſome other means.

DEPILATORY MEDICINES, thoſe applied in order to take off the hair: ſuch are lime and orpiment known to be, but theſe ought to be uſed with great caution.

DEPONENT, in latin grammar, a term applied to verbs, which have active ſignifications, but paſſive terminations or conjugations, and want one of their participles paſſive.

DEPONENT, in the law of Scotland, a perſon who makes a depoſition. See the article DEPOSITION.

DEPOPULATION, the act of committing waſte. See the article WASTE.

DEPORTATION, a ſort of baniſhment uſed by the Romans, whereby ſome iſland or other place was allotted to a criminal for the place of his abode, with a prohibition not to ſtir out of the ſame on pain of death.

DEPOSIT, among civilians, ſomething that is committed to the cuſtody of a perſon, to be kept without any reward, and to be returned again on demand.

Depoſit is diſtinguiſhed into ſimple and judiciary.

Simple DEPOSIT is either voluntary or neceſſary: neceſſary, is that done in caſe of hoſtility, ſhipwreck, fire, *&c.*

Judiciary DEPOSIT is that whoſe property is conteſted by ſeveral perſons, and depoſited in the cuſtody of ſome third perſon, by order of a judge.

DEPOSITARY, in the french law, a perſon intruſted as keeper or guardian of a depoſit. See the preceding article.

Ordinary depoſitaries are not to warrant the thing left with them, in caſe it be loſt or ſtolen, they are only to anſwer for fraud or the like.

DEPOSITION, in law, the teſtimony given in court by a witneſs, upon oath.

In chancery, depoſition is a teſtimony ſet down in writing, by way of anſwer to the interrogations exhibited in chancery, where ſuch witneſs is called deponent. Depoſitions in one cauſe may be uſed at the hearing of another, where they are between the ſame parties, *&c.* without any motion: this is not permitted in other courts, without a ſpecial order of the court of chancery. The depoſitions in chancery, after the cauſe is determined there, may be given in evidence in a trial at bar, in any of the other courts.

DEPOSITION alſo ſignifies the ſequeſtring or depriving a man of ſome dignity and office.

DEPRECATION, in rhetoric, a figure whereby the orator invokes the aid and aſſiſtance of ſome one; or prays for ſome great evil or puniſhment to befal him who ſpeaks falſely, either himſelf or his adverſary.

DEPRE-

DEPRECATORY, or DEPRECATIVE, in theology, a term applied to the manner of performing fome ceremonies in the form of prayer.

The form of abfolution is deprecative in the greek church, being conceived in thefe terms, *May God abfolve you:* whereas it is in the declarative form in the latin church, and in fome of the reformed churches, *I abfolve you.*

DEPRESSION *of equations.* See the article EQUATION.

DEPRESSION *of the pole.* When a perfon fails or travels towards the equator, he is faid to deprefs the pole, becaufe as many degrees as he approaches nearer the equator, fo many degrees will the pole be nearer the horizon. This phænomenon arifes from the fpherical figure of the earth. See the articles EARTH and POLE.

When a ftar is under the horizon, it is termed the depreffion of that ftar under the horizon. The altitude or depreffion of any ftar is an arch of the vertical intercepted between the horizon and that ftar. See the articles HORIZON and VERTICAL.

DEPRESSOR, or DEPRIMENS, in anatomy, a name applied to feveral mufcles, becaufe they deprefs the parts they are faftened to.

DEPRESSOR LABII INFERIORIS, or QUADRATUS, is a mufcle confifting of fome thin flefhy fibres, which lie immediately under the fkin of the chin; they arife from the edge of the fore-part of the whole under-jaw, and are inferted in the lower-part of the orbicularis.

DEPRESSOR LABII SUPERIORIS, or TRIANGULARIS, is a mufcle that arifes from the lower-edge of the under jaw, between the maffeter and quadratus, and afcends by the angle of the mouth to the upper-jaw. Thefe two mufcles acting together, exprefs a forrowful countenance, becaufe they draw downwards the corners of the mouth and cheeks.

DEPRESSORES NASI, are a pair of mufcles arifing from the os maxillare, above the dentes incifores; and are inferted into the extremities of the alæ, which they pull downwards.

DEPRESSOR ANGULI ORIS, a name given by Albinus to the mufcle called by others depreffor labiorum communis. See the article DEPRESSOR LABII.

DEPRESSORES OCULI, a pair of mufcles fpringing from each corner of the eye, and anfwered by another pair of the like figure and ftructure, in the lower eyelid. See the article EYE.

DEPRIMENS, the fame with depreffor. See the preceding article.

DEPRIVATION, in the canon-law, the depofing a bifhop, parfon, vicar, *&c.* from his office and preferment.

There are two forts of deprivation, the one *a beneficio,* the other *ab officio:* the deprivation *a beneficio,* is when, for fome great crime a minifter is wholly deprived of his benefice. A deprivation *ab officio,* is when a minifter is for ever deprived of his orders, which is is alfo called depofition or degradation: this is generally for fome heinous crime deferving death, and is performed by the bifhop.

DEPTFORD, a town three miles eaft of London, on the fouthern banks of the Thames; chiefly confiderable for its fine docks for building fhips, and the king's yard.

DEPTH, in geometry, the fame with altitude; though, ftrictly fpeaking, we only ufe the term depth to denote how much one body, or part of a body, is below another. See the articles ALTITUDE, HEIGHT, *&c.*

DEPTH *of a battalion, fquadron, &c.* the number of men in a file, who ftand before each other in a ftraight line. In the antient armies this was very great.

DEPURATION, the fame with clarification. See the article CLARIFICATION.

DEPURATORY FEVER, a name given by Sydenham to a fever which prevailed much in the years 1661, 1662, 1663, and 1664. He called it depuratory, becaufe he obferved that nature regulated all the fymptoms in fuch a manner, as to fit the febrile matter, prepared by proper concoction, for expulfion in a certain time, either by a copious fweat, or a freer perfpiration.

DEPUTATION, a miffion of felect perfons out of a company, or body, to a prince or affembly, to treat of matters in their name. They are more or lefs folemn, according to the quality of thofe who fend them, and the bufinefs they are fent upon.

DEPUTY, a perfon fent upon fome bufinefs, by fome community.

DEPUTY is alfo one who exercifes an office in another's right; and the forfeiture or mifde-

misdemeanor of such deputy shall cause the person, whom he represents, to lose his office. A principal officer may not appoint his deputy in all cases, unless the grant of the office will justify him in so doing; but when an office descends to an infant, he may make a deputy of course. Judges have no power to hold their courts by deputy: recorders, however, may do it. It is held a coroner cannot appoint a deputy, it being a judicial office of trust, annexed to the person. And if the office of parkership be granted to one, he cannot depute another, because it is an office of trust and confidence.

DEPUTATUS, among the antients, a name applied to persons employed in making of armour: and likewise to brisk active people, whose business was to take care of the wounded in engagements, and carry them off the field.

DEPUTATUS, δεπύτατος, in the greek church, an inferior officer, like an usher, who in processions kept the crowd off the patriarch.

DEREHAM, a market-town of Norfolk, about fifteen miles west of Norwich: east long. 1°, and north lat. 52° 40′.

DERELICTS, in the civil law, such goods as are wilfully relinquished by the owner. It also signifies a thing forsaken, or cast away by the sea.

DERIVATION, in medicine, is when a humour, which cannot be conveniently evacuated at the part affected, is attracted from thence, and discharged at some more proper place in its vicinity; or is drawn from a noble, to a more ignoble part, where it is less capable of doing injury. Thus a blister is applied upon the neck to draw thither the matter, in cases of defluxions upon the eyes.

DERIVATIVE, in grammar, a word which is derived from another called its primitive. See the article PRIMITIVE. Thus *manhood* is derived from *man*, *deity* from *deus*, and *lawyer* from *law*.

DERMA, in anatomy, the same with cutis. See the article CUTIS.

DERMESTES, in zoology, a genus of insects of the order of the coleopteræ, the antennæ of which are of a clavated figure and perfoliated transversly.

There are a great many species of this genus, confounded by some with beetles. See plate LXIX. fig. 2.

DERNIER RESSORT. See RESSORT.

DEROGATION, in the french law, an act which annuls a preceding one, either in whole, or in part. In general terms, they are not regarded in judicature; they must be in specific, and in formal terms.

DEROGATORY, a clause importing derogation. A derogatory clause in a testament, is a certain sentence, cypher, or secret character, which the testator inserts in his will, and of which he reserves the knowledge to himself alone, adding a condition that no will he may make hereafter is to be reckoned valid, if this derogatory clause is not inserted expresly, and word for word. It is a precaution invented by lawyers against later wills extorted by violence, or obtained by suggestion.

DERVIS, a name given to all mahommedan monks, though of various orders. The most noted among them are the bektashi, the mevelevi, the kadri, and the seyah. The bektashi, who are allowed to marry and live in cities and towns, are obliged, by the rules of their order, to visit remote lands, and to salute every one they meet with *gazel*, or love-songs, and with *esma*, or the invocation of the names of God, and humbly to wish him prosperity, which they do by repeating the word *eivallah*, a solemn exclamation of the wrestlers, by which the conquered yields the palm to the conqueror. The mevelevi, so called from Mevelava their founder, are used to turn round for two or three hours together, with such swiftness that you cannot see their faces; they are great lovers of music: in their monasteries they profess great humility and poverty, and when visited make no distinction of persons; they first bring their guests coffee to drink; and, if the ways have been dirty, they wash their feet and sandals. The kadri, with a peculiar superstition, emaciate their bodies; they go quite naked, except their thighs, and often join hands and dance, sometimes a whole day, repeating with great vehemence, *hu! hu! hu!* (one of the names of God) till, like madmen, they fall on the ground, foaming at the mouth, and running down with sweat: the prime vizir Kupruli Achmed Pasha, thinking this sect unbecoming the mahommedan religion, ordered it to be suppressed; but, after his death, it revived, and is at present more numerous than ever, especially at Constantinople,

nople. The feyah are wanderers, and though they have monafteries, yet they often fpend their whole life in travelling; when they are fent out, their fuperiors impofe upon them fuch a quantity of money or provifions, forbidding them to come back till they have procured it, and fent it to the monaftery; wherefore when a feyah comes into a town, he cries aloud in the market-place, *Ya allah fenden, &c. O God! give me, I pray, five thoufand crowns*, or *a thoufand meafures of rice*. Many of thefe dervifes travel over the whole mahommedan world, entertaining the people wherever they come, with agreeable relations of all the curiofities they have met with. There are dervifes in Egypt, who live with their families, and exercife their trades, of which kind are the dancing dervifes at Damafcus. They are all diftinguifhed among themfelves by the different forms and colours of their habits; thofe of Perfia wear blue; the folitaries and wanderers wear only rags of different colours; others carry on their heads a plume made of the feathers of a cock; and thofe of Egypt wear an octagonal badge of a greenifh white alabafter at their girdles, and a high ftiff cap, without any thing round it.

DERWENT, a river, which taking its rife in the north riding of Yorkfhire, runs fouth, and falls into the Oufe.

DERWENT-WATER, a river of Cumberland, which falls into the irifh fea below Cockermouth.

DESART, a large extent of country entirely barren, and producing nothing. In this fenfe fome are fandy defarts, as thofe of Lop, Xamo, Arabia, and feveral others, in Afia; in Africa, thofe of Lybia and Zara: others are ftony, as the defart of Pharan in Arabia Petrea.

The DESART, abfolutely fo called, is that part of Arabia fouth of the holy land, where the children of Ifrael wandered forty years.

DESCANT, in mufic, the art of compofing in feveral parts. See COMPOSITION.

Defcant is threefold, *viz.* plain, figurative, and double.

Plain DESCANT is the ground-work and foundation of all mufical compofitions, confifting altogether in the orderly placing of many concords, anfwering to fimple counter-point. See COUNTER-POINT.

Figurative or *florid* DESCANT, is that part of an air of mufic, wherein fome difcords are concerned, as well, though not fo much, as concords. This may be termed the ornamental and rhetorical part of mufic, in regard that there are introduced all the varieties of points, fyncopes, diverfities of meafures, and whatever is capable of adorning the compofition.

DESCANT *double*, is when the parts are fo contrived, that the treble, or any high part, may be made the bafs; and, on the contrary, the bafs the treble.

DESCENDANT, in genealogy, a term relative to afcendant, and applied to a perfon who is born or iffued from fome other referred to: thus mankind are faid to be the defcendants of Adam. See the article DESCENT.

DESCENSION, or DESCENDING, in general, fignifies much the fame with defcent. See the article DESCENT.

DESCENSION, in aftronomy, is either right or oblique.

Right DESCENSION is an arch of the equinoctial, intercepted between the next equinoctial point and the interfection of the meridian, paffing thro' the center of the object, at its fetting, in a right fphere.

Oblique DESCENSION, an arch of the equinoctial intercepted between the next equinoctial point and the horizon, paffing through the center of the object, at its fetting, in an oblique fphere.

DESCENSIONAL, fomething belonging to defcenfion. See DESCENSION.

DESCENTIONAL DIFFERENCE, that between the right and oblique defcenfion of any heavenly body. See DESCENSION.

DESCENT, in general, is the tendency of a body from a higher to a lower place; thus all bodies, unlefs otherwife determined by a force fuperior to their gravity, defcend towards the center of the earth: the planets too may be faid to defcend from their aphelion to the perihelion of their orbits, as the moon does from the apogee to the perigee.

Heavy bodies, meeting with no refiftance defcend with an uniformly accelerated motion, for the laws of which fee the article ACCELERATION.

Laws of the DESCENT *of bodies.* 1. All bodies near the furface of the earth defcend perpendicularly at the rate of fixteen feet one inch in a fecond of time. 2. The velocity of a body defcending in an inclined plane, at the end of any given time, is to the velocity that it would acquire by defcending perpendicularly in the fame time, as the altitude of the inclined plane is to its length. 3. The laft

last velocity acquired by the direct descent, is to the last velocity acquired in the same time by the oblique descent, as the absolute gravity is to the relative gravity of the descending body. 4. The line described by the direct descent, is to the line described in the same time by the oblique descent, as the length of the oblique plane is to its height. 5. If the line described by the direct descent be to the line described by the oblique descent, as the height of the inclined plane to its length, then the times of descent shall also be in the same proportion, and the last velocities equal. 6. The last velocities acquired upon several inclined planes of the same height, however different in length, are equal. 7. The time of oblique descent thro' any chord of a circle, drawn from its lowest point, is equal to the time of a direct descent thro' the diameter of that circle. 8. The last acquired velocities of a body, descending to the lowest point of a given circle, through different chords, are as those chords. 9. The time of the descent of a body in any arch of a semicycloid, is equal to the time of its descent through any other arch, whether longer or shorter, of the same curve. 10. A body will descend sooner along an arch of a cycloid, than along that of any other curve, drawn between the same points. 11. If water runs out through a hole made in the bottom of a parabolic conoid, the surface of the water will descend equal spaces in equal times. 12. A body descends in a resisting medium with a force only equal to the excess of its gravity above that of an equal bulk of the medium. 13. If a body be thrown downwards, in a resisting medium, with such a force as shall make the resistance of the medium equal to the acceleration of gravity, it will afterwards descend with an uniform motion. 14. If a body descends through any number of inclined planes, it will acquire the same velocity at the end of its fall, as though it had fallen through a plane equal in height to the whole, and of the same inclination with the last of them.

DESCENT, or DISCENT, in law, an order or method whereby lands or tenements are derived to any man from his ancestors.

It is either by the common law, custom, or statute. By the common law, as where a person has lands of inheritance in fee, and dies without having made any disposal thereof: wherefore the land descends and goes in course to the eldest son and heir. By custom, as where the lands sometimes descend to all the sons; or to all the brothers, where one brother dies without issue, as in gavel-kind, &c. And descent by statute is a descent in fee-tail, as directed by the manner of the limitation or settlement, pursuant to stat. Westm. 2. and 13 Ed. I.

Descent, at common law, is either lineal or collateral.

Lineal descent is that conveyed down in a right line from the grand-father to the father, from the father to the son, and from the son to the grand-son. Collateral descent is that springing out of the side of the line, or blood, as from a man to his brother, nephew, or the like.

DESCENT, in genealogy, the order or succession of descendants in a line or family; or their distance from a common progenitor: thus we say, one descent, two descents, &c. See EXTRACTION.

DESCENT, in heraldry, is used to express the coming down of any thing from above; as, a lion en descent, is a lion with his head towards the base points, and his heels towards one of the corners of the chief, as if he were leaping down from some high place.

DESCENT, in fortification, are the holes, vaults, and hollow places made by undermining the ground.

The descent into the moat or ditch is a deep passage made through the esplanade and covert-way, in form of a trench, whereof the upper part is covered with madriers and clays, to secure the besiegers from the enemy's fire. In wet ditches this trench is on a level with the surface of the water, but in dry ones it is sunk as deep as the bottom of the ditch.

DESCRIBENT, in geometry, a line or surface, which, by its motion, describes a surface or solid.

DESCRIPTION is such a strong and beautiful representation of a thing, as gives the reader a distinct view and satisfactory notion of it.

Descriptions are almost peculiar to poetry: historians indeed describe things, places, and persons; but not so much for the sake of ornament, as of necessity. Orators likewise attempt descriptions when they have a mind to work upon the passions; but neither the one nor the other use them as decorations to their writings, which poets generally do, very successfully, not only with a design to

move the paſſions, but to pleaſe the fancy. Great judgment is required in the due exerciſe of this art. A judicious author will omit low and vulgar circumſtances, and chiefly beſtow his pains to complete all the eſſential and maſterly ſtrokes, cutting off all ſuperfluities, and rejecting the moſt pleaſing thought and florid lines, when foreign to his ſubject: many things muſt be left to the imagination of the reader, and ſeaſonable ſilence has its emphaſis; thus Virgil tells us, Georg. iv. 457. that Eurydice was killed by a monſtrous ſerpent, lurking in a bank; but ſays nothing more of that venemous creature. A poetaſter would probably have ſpent as many lines in the deſcription of it, as compoſed that admirable poem. The deſcription of a perſon is called a character, in drawing which the true proof of art and judgment is to hit a beautiful likeneſs, and, with a delicate touch, to give thoſe features and colours which are peculiar to the perſon, and diſtinguiſh him from the reſt of mankind. In every good and lively deſcription, a man muſt come to an enumeration of the chief particulars; for generals are often obſcure and faint. A judicious author, by ſetting every thing in full view, makes a ſtrong and laſting impreſſion on the reader.

DESEADA, or DESIDERADA, one of the Caribbee-iſlands, lying eaſtward of Guadaloupe.

DESERTER, in a military ſenſe, a ſoldier who, by running away from his regiment or company, abandons the ſervice

A deſerter is, by the articles of war, puniſhable by death, and, after conviction, is hanged at the head of the regiment he formerly belonged to, with his crime writ on his breaſt, and ſuffered to hang till the army leave that camp, for a terror to others.

DESHACHE', in heraldry, is where a beaſt has its limbs ſeparated from its body, ſo that they ſtill remain on the eſcutcheon, with only a ſmall ſeparation from their natural places

DESIDERATUM is uſed to ſignify the deſirable perfections in any art or ſcience: thus, it is a deſideratum with the blackſmith, to render iron fuſible by a gentle heat, and yet preſerve it hard enough for ordinary uſes; with the glaſsman and looking-glaſs maker, to render glaſs malleable, with the clock-maker, to bring pendulums to be uſeful, where there are irregular motions; with the braſier and copperſmith, to make malleable ſolder; with the ſhipwright, to build veſſels that will ſail under water; with the diver, to procure manageable inſtruments for conveying freſh air to the bottom of the ſea, ſufficient for reſpiration and the burning of lights; with the aſſay-maſter, to melt or copel ores or metals immediately, without the uſe of bellows or furnaces; and with the carvers and joiners, to faſhion wood in moulds like plaiſter of paris, or burnt alabaſter, &c. And though, as Mr. Boyle obſerves, the obtaining of theſe deſiderata may be thought chimeral, yet it is proper they ſhould be propoſed; for, although perfection may not be attainable, yet approaches to it may be made, and arts thereby improved. To this may be added, that the making of iron malleable, with pit-coal was once looked upon as chimerical, yet it is now put in practice, to the great advantage of the owners of ſeveral mines in this kingdom.

All arts have their defects; and it is not at firſt to be gueſſed, for how many of theſe remedies may be found, by means of chemical reſearches, properly directed. Chemiſtry itſelf is greatly defective in many particulars, as in an experimental hiſtory of general fermentation, ſeparatory and combinatory; in ſubjects of the animal, vegetable, and mineral kingdoms. The ſchemes for new trades will riſe occaſionally in proſecuting many of the ſubjects; thus it is natural for the common operations of brewing and ſugar-baking, to ſuggeſt that ſugar may be procured from malt and other vegetables. That nurſeries of peculiar ferments, both native and foreign, may be raiſed on the common principles; and it is evident that the introduction of ſuch new trades would greatly improve the buſineſs of brewing, ſugar-baking, and the like.

DESIGN, in a general ſenſe, the plan, order, repreſentation, or conſtruction of a building, book, painting, &c.

In building, the term ichnography may be uſed, when by deſign is only meant the plan of a building, or a flat figure drawn on paper: when ſome ſide or face of the building is raiſed from the ground, we may uſe the term orthography; and when both front and ſides are ſeen, in perſpective, we may call it ſcenography. See ICHNO-

Ichnography, Orthography, and Scenography.

Design, in the manufactories, expresses the figures wherewith the workman enriches his stuff, or silk, and which he copies after some painter, or eminent draughts-man, as in diaper, damask, and other flowered silk and tapestry, and the like.

In undertaking of such kinds of figured stuffs, it is necessary, says Monf. Savary, that, before the first stroke of the shuttle, the whole design be represented on the threads of the warp; we do not mean in colours, but with an infinite number of little packthreads, which, being disposed so as to raise the threads of the warp, let the workmen see, from time to time, what kind of silk is to be put in the eye of the shuttle, for woof. This method of preparing the work is called reading the design, and reading the figure, which is performed in the following manner: a paper is provided, considerably broader than the stuff, and of a length proportionate to what is intended to be represented thereon. This they divide lengthwise, by as many black lines as there are intended threads in the warp; and cross these lines, by others drawn breadthwise, which, with the former, make little equal squares: on the paper thus squared, the draughts-man designs his figures, and heightens them with colours, as he sees fit. When the design is finished, a workman reads it, while another lays it on the simblot.

To read the design, is to tell the person who manages the loom, the number of squares, or threads, comprised in the space he is reading, intimating at the same time whether it is ground or figure. To put what is read on the simblot, is to fasten little strings to the several packthreads, which are to raise the threads named; and thus they continue to do till the whole design is read.

Every piece being composed of several repetitions of the same design, when the whole design is drawn, the drawer, to re-begin the design afresh, has nothing to do but to raise the little strings, with slip-knots, to the top of the simblot, which he had let down to the bottom: this he is to repeat as often as is necessary till the whole be manufactured.

The ribbon-weavers have likewise a design, but far more simple than that now described. It is drawn on paper with lines and squares, representing the threads of the warp and woof. But instead of lines, whereof the figures of the former consist, these are constituted of points only, or dots, placed in certain of the little squares, formed by the intersection of the lines. These points mark the threads of the warp that are to be raised, and the spaces left blank denote the threads that are to keep their situation: the rest is managed as in the former.

Design is also used, in painting, for the first idea of a large work, drawn roughly, and in little, with an intention to be executed and finished in large. The art of painting has been by some of the greatest masters divided into the design, or draught, the proportion, the expression, the claro-obscuro, the ordonnance, the colouring, and the perspective.

Design, in painting, is the simple contour, or outlines of the figures intended to be represented, or the lines that terminate and circumscribe them: such design is sometimes drawn in crayons, or ink, without any shadows at all; sometimes it is hatched, that is, the shadows are expressed by sensible outlines, usually drawn across each other with the pen, crayon, or graver. Sometimes, again, the shadows are done with the crayon rubbed so as that there do not appear any lines: at other times, the grains or strokes of the crayon appear, as not being rubbed: sometimes the design is washed, that is, the shadows are done with a pencil in indian ink, or some other liquor; and sometimes the design is coloured, that is, colours are laid on much like those intended for the grand work.

The essential requisites of a design are correctness, good taste, elegance, character, diversity, expression, and perspective. Correctness depends on the justness of the proportions, and knowledge of anatomy. Taste is a certain manner of correctness peculiar to one's self, derived either from nature, masters, or studies, or all of them united. Elegance gives a delicacy that not only strikes persons of judgment, but communicates an agreeableness that pleases universally. The character is what is peculiar to each thing, wherein there must be diversity, insomuch that every thing has its peculiar character to distinguish it. The expression is the representation of an object, according

cording to the circumftances it is fuppofed to be in. Perfpective is the reprefentation of the parts of a painting, or a figure, according to the fituation they are in with regard to the point of fight. The defign or draught, is a part of the greateft import and extent in painting. It is acquired chiefly by genius and application, rules being of lefs avail here than in any other branches of the art, as colouring, *&c.* The principal rules that regard defign are, that novices accuftom themfelves to copy good originals at firft fight; not to ufe fquares in drawing, left they ftint and confine their judgment; to defign well from life, before they practife perfpective; to learn to adjuft the fize of their figures to the vifual angle, and the diftance of the eye from the model or object; to mark out all the parts of their defign before they begin to fhade; to make their contours in great pieces, without taking notice of the little mufcles, and other breaks; to make themfelves mafters of the rules of perfpective; to obferve the perpendicular, parallel, and diftance of every ftroke; to compare and oppofe the parts that meet and traverfe the perpendicular, fo as to form a kind of fquare in the mind, which is the great and almoft the only rule of defigning juftly; to have a regard not only to the model, but to the parts already defigned, there being no fuch thing as defigning with ftrict juftnefs, but by comparing and proportioning every part to the firft. All the other rules relate to perfpective. See PERSPECTIVE.

DESIGNATION, the act of marking or indicating, and making a thing known. There were defignations of the confuls and other magiftrates among the Romans fome time before their election.

DESIGNATOR, in roman antiquity, a fort of petty mafter of the ceremonies, who affigned every body their places in the theatres, and other public fhews. The Romans had officers of this nature attending all their folemn fhews and proceffions, for directing precedencies. The defignator was one of the goddefs Libitina's principal fervants, the fhews of the funerals of perfons of quality being marfhalled by the defignator. When he went to raife the corps, he was attended with a train of funeral officers called libitinarii, fubdivided into pellinatores, vefpiliones, uftores, *&c.* All thefe, habited in black, walked before the defignator, as mace-bearers before magiftrates.

DESIGNING, the art of delineating or drawing the appearance of natural objects, by lines, on a plane.

To defign, according to the rules of mathematics, makes the object of perfpective. See the article PERSPECTIVE.

To defign by the camera obfcura. See the article CAMERA OBSCURA.

Mechanical method of DESIGNING. There are feveral methods of defigning mechanically. The following is the method of the learned Sir Chriftopher Wren, and may be put in practice with great eafe.

A is a fmall fight, with a fhort arm B (plate LXIX. fig. 5.) which may be turned round about, and moved up and down the fmall cylinder C D, which is fcrewed into the piece E D, at D; this piece E D moving round about the center E, by which means the fight may be removed either towards E or F.

E F is a ruler faftened on the two rulers G G, which rulers ferve both to keep the fquare frame S S S S perpendicular, and, by their fliding through the fquare holes T T, they ferve to ftay the fight, either farther from, or nearer, to the faid frame; on which frame is ftuck, with a little wax, the paper O O O O, whereon the picture is to be drawn by the pen I. The pen I is, by a fmall brafs handle V, fo fixed to the ruler H H, that the point I may be kept very firm, fo as always to touch the paper. H H is a ruler that is conftantly, by means of the fmall ftrings *a a a, b b b,* moved horizontally, or parallel to itfelf; at the end of which is ftuck a fmall pin, whofe head P is the fight, which is to be moved up and down on the out-lines of any object.

The contrivance of the ftrings is this: the two ftrings *a a a, b b b,* are exactly of an equal length. Two ends of them are faftened into a fmall leaden weight, which is employed in a focket on the backfide of the frame, and ferves exactly to counterpoife the ruler H H, being of an equal weight with it. The other two ends of them are faftened to two fmall pins H H, after they have rolled about the fmall pullies M M, L L, K K; by means of which pullies, if the pen I be taken hold of, and moved up and down the paper, the ftring moving very eafily, the ruler will always remain in an horizontal pofition.

The manner of ufing it is this: fet the inftrument upon a table, and fix the fight

A at what height above the table, and at what diftance from the frame S S S S, you pleafe. Then looking through the fight A, holding the pen I in your hand, move the head of the pin P up and down the out-lines of the object, and the point of the pen I will defcribe on the paper O O O O the fhape of the object fo traced.

DESISE, a town of France, fituated on the river Loire, fifteen miles fouth-eaft of Nevers: eaft longitude 3° 32′, north latitude 46° 48′.

DE SON TORT DEMESN, in law, a formula ufed, in an action of trefpafs, by way of reply to the defendant's plea; fignifying that the trefpafs was his own voluntary and free act.

DESPOTE, a term fometimes ufed for an abfolute prince. See the next article.

Under the emperors of Conftantinople, defpote was a title of honour given to the emperor's fons, or fons in law; as alfo to their colleagues, and partners in the imperial dignity, in the fame manner as Cæfar was at Rome. See the article CÆSAR.

DESPOTICAL, in general, denotes any thing that is uncontrouled and abfolute; but is particularly ufed for an arbitrary government, where the power of the prince is unlimited, and his will a law to his fubjects; fuch are thofe of Turky, Perfia, and moft of the eaftern governments; and even thofe of Europe, if we except the republics, our own, and the fwedifh government.

DESPOUILLE', in heraldry, the whole cafe, fkin, or flough of a beaft, with the head, feet, tail, and all appurtenances, fo that being filled and ftuffed, it looks like the intire creature.

DESPUMATION, a term fometimes ufed for the clarifying a liquor, by the fkimming off its froth. See CLARIFICATION.

DESQUAMATION, the fame with exfoliation. See EXFOLIATION.

DESSAW, a city of upper Saxony, in Germany, fituated on the river Elbe, fixty miles north-weft of Drefden, and fubject to the prince of Anhalt Deffaw: eaft long. 12° 40′, north lat. 51° 50′.

DESSERT, or DESART, a fervice of fruits and fweet-meats, ufually ferved up laft to table.

DESSICCATIVE, or DESICCATIVE, in pharmacy, an epithet applied to fuch topical medicines as dry up the humours flowing to a wound or ulcer. See the article WOUND.

DESTILLATION, or DISTILLATION. See the article DISTILLATION.

DESTINIES, in mythology, the fame with parcæ. See the article PARCÆ.

DESTINY, among philofophers and divines, the fame with fate. See FATE.

DESTRUCTION, in general, an alteration of any thing from its natural ftate to one contrary to nature; whereby it is deemed the fame with corruption. See the article CORRUPTION.

A chemical deftruction, or corruption, is nothing but a refolution of the whole naturally mixt body into its parts.

DESUDATION, in medicine, a profufe and inordinate fweat, fucceeded by an eruption of puftules, called fudamina, or heat-pimples. See the article SUDAMINA.

DESULTOR, in antiquity, a vaulter, or leaper, who, leading one horfe by the bridle, and riding another, jumped from the back of one to the other, as the cuftom was after they had run feveral courfes, or heats.

This practice required great dexterity, being performed before the ufe of either faddles or ftirrups. The cuftom was practifed in the army, when neceffity required it; but chiefly among the Numidians, who always carried two horfes, at leaft, with them for that purpofe, changing them as they tired. The Greeks and Romans borrowed the practice from them, but only ufed it at races, games, &c. The Sarmatæ were great mafters of this exercife, and huffars have ftill fome remains of it; but now we fee the moft dexterous feats of this kind that perhaps were ever known in any age or nation performed by our countryman, Mr. Johnfon.

DETACHED PIECES, in fortification, are fuch out-works as are detached, or at a diftance from the body of the place; as demilunes, ravelines, baftions, &c.

In painting, the figures are faid to be well detached, when they ftand free and difengaged from each other.

DETACHMENT, in military affairs, a certain number of foldiers drawn out from feveral regiments or companies equally, to be employed as the general thinks proper, whether on an attack, at a fiege, or in parties to fcour the country.

A detachment of two or three thoufand men, is a command for a brigadier; eight hundred, for a colonel; four or five hundred for a lieutenant colonel. A captain never marches on a detachment with lefs than fifty men, a lieutenant, an enfign, and two ferjeants. A lieu-

lieutenant is allowed thirty, and a ferjeant; and a ferjeant ten or twelve men. Detachments are fometimes made of intire fquadrons and batallions.

DETENTS, in clock-work, are thofe ftops, which, by being lifted up or let down, lock or unlock the clock in ftriking. See the article CLOCK.

DETENT-WHEEL, or HOOP-WHEEL, in a clock, that wheel which has a hoop almoft round it, wherein there is a vacancy at which the clock locks.

DETERGENTS, *detergentia*, in pharmacy, fuch medicines as are not only foftening and adhefive, but alfo, by a peculiar activity, conjoined with a fuitable configuration of parts, are apt to abrade, and carry along with them fuch particles, as they lay hold on in their paffage.

Medicines of this kind are fuppofed to cleanfe, and fill up with new flefh, all ulcerations and foulnefs occafioned thereby, whether internal or external. To do this internally, the medicine is fuppofed to maintain its primary properties, till it arrives at the place of action, where it is intitled to the appellation of a detergent and vulnerary, by its adhefive quality, which confifts in the comparative largenefs of its furface, and flexibility of its component parts; for by this it readily adheres to the flough of ulcerous exudations, which are eafily carried along with the medicine; and when this is done, what was inftrumental in deterging, will afterwards ftick to the cutaneous filaments, till, by the protrufion of proper nourifhment, the ulcer is healed; and, in like manner, the operation of external fubftances are accounted for: only this is to be taken notice of, that internally whatfoever mixes with the animal fluids, will be the firft feparated and left behind; for all thofe parts which are fpecifically heavieft, will move neareft the axis of the canals, becaufe their momenta are greateft, and will carry them nearly in a ftraight line: but the lighter parts will be always juftled to the fides, where they fooneft meet with out-lets, or are ftruck into the eroded cavities, in which they adhere and make part of the fubftance. Thus it is eafy to conceive how an increafe of thofe qualities of activity and adhefion may make a medicine arife to the greateft efficacy in this refpect, even fo far, as to fetch off the membranes and capillary veffels.

DETERMINATE PROBLEM, in geometry, that which has but one, or, at leaft, a limited number of anfwers: as the following problem, which has but one only folution, *viz.* To defcribe an ifofceles triangle on a given line, whofe angles at the bafe fhall be double that at the vertex. But the following hath two folutions, *viz.* To find an ifofceles triangle, whofe area and perimeter are given.

A determinate problem may be either fimple or linear, plain, folid, or furfolid.

DETERMINATION, in mechanics, fignifies much the fame with the tendency or direction of a body in motion. See the articles DIRECTION and MOTION.

DETERMINATION, among fchool-divines, is an act of divine power, limiting the agency of fecond caufes, in every inftance, to what the deity predeftinated concerning them. See PREDESTINATION.

Such a determination the Thomifts, and other predeftinarians, maintain neceffary to all the actions of natural agents, particularly mankind. The Jefuits, on the other hand, deny fuch a determination, as fuppofing it inconfiftent with liberty and free-will.

DETERSIVES, in pharmacy, the fame with detergents. See DETERGENTS.

DETINUE, in law, a writ or action that lies againft one who has got goods or other things delivered to him to keep, and afterwards refufes to deliver them. In this action the thing detained is generally to be recovered, and not damages; though, if a perfon cannot recover the thing itfelf, he fhall recover the damages, and alfo for the detainer. The nature of a thing muft continue without any alteration, to intitle this action: befides, it is neceffary that the thing detained be known; therefore it does not lie for money out of a bag, corn out of a fack, *&c.* Where goods are delivered to a perfon, and he delivers them over to another, action of detinue may be had againft the fecond perfon; and notwithftanding he delivers the things to a perfon who has a right to the fame, yet he is chargeable. If the perfon to whom a thing is delivered happen to die, action of detinue lies againft his executors, *&c.* A man may have a general detinue againft another that finds his goods; but if before the owner brings his action, the finder fells them, or they are recovered from him on an execution, *&c.* he cannot have detinue.

DETINUE *of charters.* An action for detinue lies for deeds and charters which make the title to lands. An heir, in cafe of

of diſſeiſin, may have a detinue of charters, though he has not land. If in this action the iſſue be upon the detinue, and it is found by jury that the defendant hath burnt the charters, the plaintiff ſhall have judgment to recover the lands in damages.

DETINUE *of goods in frank marriage*, is had after a divorce between a man and his wife, for her to recover the goods given with her in marriage.

DETONATION, in chemiſtry, the noiſe and exploſion which any ſubſtance makes upon the application of fire to it. It is alſo called fulmination.

DETRANCHE', in heraldry, a line bendwiſe, proceeding always from the dexter ſide, but not from the very angle, diagonally athwart the ſhield.

DETTINGEN, a village of Germany, about nine miles eaſt of Hanau, in the circle of the upper Rhine: eaſt long. 8° 45′, and north lat. 50° 8′.

DEVA, a port-town of Spain, ſituated on the bay of Biſcay, forty miles eaſt of Bilboa: weſt long. 2° 10′, and north lat. 43° 20′.

DEVASTAVIT, or DEVASTAVERUNT, BONA TESTATORIS, in law, a writ which lies againſt executors or adminiſtrators for waſting the teſtator's goods, or paying debts upon ſimple contracts before debts on bonds, and other ſpecialities; alſo for paying legacies before debts; and, generally, for ſquandring the effects of the deceaſed, and not paying his debts.

DEVENERUNT, in law, a writ which lay formerly on the death of the heir of the king's tenant, and directed to the eſcheator; commanding him to inquire by the oaths of good and lawful men, what lands and tenements came to the king by the death of the tenent.

DEVENSHRING, or DENSHRING, a term uſed in many parts of the kingdom for burning of land. See BURNING *of land*.

DEVENTER, a city of the united Provinces, and province of Overyſſel, about eight miles north of Zutphen: eaſt long. 6°, and north lat. 52° 20′.

DEVIATION, in old aſtronomy, ſignified the motion of the deferent or excentric, whereby it advanced to, or receded from, the ecliptic.

DEVICE, or DEVISE, among painters. See the article DEVISE.

DEVIL, Διάβολος, an evil angel, one of theſe celeſtial ſpirits, caſt down from heaven, for pretending to equal himſelf with God. The Ethiopians paint the devil white, to be even with the Europeans who paint him black. There is no mention of the word devil in the Old Teſtament, but only of the word Satan and Belial: nor do we meet with it in any heathen authors, in the ſenſe it is taken among chriſtians, that is, as a creature revolted from God. Their theology went no farther than to evil genii, or dæmons. See the articles GENIUS and DÆMONS.

Some of the american idolaters have a notion of two collateral, independent beings, one of whom is good, and the other evil; which laſt they imagine has the direction and ſuperintendance of this earth, for which reaſon they chiefly worſhip him: whence thoſe that give us an account of the religion of theſe ſavages give out, with ſome impropriety, that they worſhip the devil. The Chaldeans, in like manner, believed both a good principle and an evil one, which laſt they imagined was an enemy to mankind.

Iſaiah, ſpeaking, according to ſome commentators, of the fall of the devil, calls him Lucifer, from his former elevation and ſtate of glory: but others explain this paſſage of Iſaiah in reference to the king of Babylon, who had been precipitated from his throne and glory. The Arabians call Lucifer, Eblis, which ſome think is only a diminutive or corruption of the word Diabolus.

DEVIL-IN-A-BUSH, a plant called by authors nigella. See the article NIGELLA.

DEVIL'S BIT, the ſame with the ſcabious of botaniſts. See the article SCABIOUS.

DEVINCTION, in antiquity, a kind of love-charm, deſcribed by Virgil in his eighth eclogue: it conſiſted in tying certain knots, and repeating a formula of words.

DEVISE, or DEVICE, in heraldry, painting and ſculpture, any emblem uſed to repreſent a certain family, perſon, action, or quality; with a ſuitable motto, applied in a figurative ſenſe. See MOTTO.

The eſſence of a deviſe conſiſts in the metaphorical ſimilitude between the things repreſenting and repreſented: thus a young nobleman, of great courage and ambition, is ſaid to have borne for his deviſe, in the laſt carrouſal at the court of France, a rocket mounted in the air, with this motto in italian, *poco duri purche m' inalzi*; expreſſing, that he preferred a ſhort life, provided he might thereby attain to glory and eminence.

The Italians have reduced the making deviſes into an art, ſome of the principal laws

laws of which are thefe: 1. That there be nothing monftrous or extravagant in the figures. 2. That figures be never joined which have no relation or affinity to each other; excepting fome whimfical unions eftablifhed in antient fables, which cuftom has authorifed. 3. That the human body be never ufed. 4. The fewer the figures the better. 5. The motto fhould be every way fuitable.

DEVISE is frequently alfo ufed for cipher. See the article CIPHER.

DEVISE, in law, the act whereby a perfon bequeaths his lands or tenements to another, by his laft will and teftament.

The perfon who makes this act, is called the devifor, and he in whofe favour the act is made, is termed in law the devifee. The law interprets the words of a will in a larger and more favourable fenfe than thofe of a deed: for if land be devifed to a man to have to him for ever, or to have to him and his affigns, in thofe cafes the devifee fhall have a fee-fimple; yet if given in the fame manner by feoffment, grant, or gift, he fhall have but an eftate for life: fo if one devife land to an infant in his mother's belly, it is a good and valid devife, though it is otherwife by feoffment, grant, or gift; for in thofe cafes, there ought to be one of ability to receive prefently, otherwife it is void. See the articles DEED and WILL.

DEVISES, a borough-town in Wiltfhire, eighteen miles north-weft of Salifbury: weft longitude 2° 6′, and north latitude 51° 25′.

It fends two members to parliament.

DEUNX, in roman antiquity, eleven ounces, or $\frac{11}{12}$ parts of the as. See As.

DEVOLVED, fomething acquired by right of devolution. See the next article.

DEVOLUTION, in law, a right acquired by fucceffion from one to another.

DEVONSHIRE, a county in the weft of England, bounded by the Briftol channel, on the north; by Somerfetfhire and Dorfetfhire, on the eaft; by the englifh channel, on the fouth; and by Cornwal, on the weft. From this county the noble family of Cavendifh take the title of duke.

DEVOTION, *devotio*, a fincere ardent worfhip of the deity.

Devotion, as defined by Jurieu, is a foftening and yielding of the heart, with an internal confolation, which the fouls of believers feel in the practice or exercife of piety. By devotion is alfo underftood certain religious practices, which a perfon makes it a rule to difcharge regularly, and with reafon, if the exactitude be founded on folid piety, otherwife it is vanity or fuperftition. That devotion is vain and trifling, which would accommodate itfelf both to God and to the world.

DEVOTION, among the Romans, was a kind of facrifice, or ceremony, whereby they confecrated themfelves to the fervice of fome perfon. The antients had a notion, that the life of one might be ranfomed by the death of another, whence thofe devotions became frequent for the lives of the emperors. Devotion to any particular perfon, was unknown among the Romans till the time of Auguftus. The very day after the title of Auguftus had been conferred upon Octavius, Pacuvius, a tribune of the people, publicly declared, that he would devote himfelf to Auguftus, and obey him at the expence of his life, as was the practice among barbarous nations, if he was commanded. His example was immediately followed by all the reft, till, at length, it became an eftablifhed cuftom never to go to falute the emperor, without declaring that they were devoted to him. Before this, the practice of the Romans was that of devoting themfelves to their country. The devotion of Decius, who, after devoting himfelf to his country, threw himfelf into the hands of his enemies and was killed, is faid to have gained the Romans the victory.

DEVOURING, in heraldry, is when fifhes are borne in an efcutcheon in a feeding pofture, for they fwallow all the meat whole.

DEUTERO-CANONICAL, in theology, a term applied to certain books of fcripture which were added to the canon after the reft; either becaufe they were not wrote till after the canon was compiled, or becaufe of fome debate in regard to their canonicity.

The Jews undoubtedly acknowledge feveral books in their canon which were put there later than the reft. They alledge, that under Efdras, a great affembly of their doctors, which, by way of eminence, they term the great fynagogue, collected the holy books, which now compofe the hebrew Old Teftament: and they allow, that this affembly put books therein, that had not been in it before the babylonifh captivity. Such are thofe of Daniel, Ezekiel, Haggai, &c. and the books of Efdras and Nehemiah.

The church of Rome added, fince then, others

others to the canon that were not in the canon of the Jews, nor could be there, by reafon fome of them were not compofed till after: fuch are the books of Ecclefiafticus, with feveral of the apocryphal books; as thofe of the Maccabees, Wifdom, &c. Others were added ftill later, by reafon their canonicity had not been examined; and till fuch examen and judgment, they might be fet afide at pleafure.

The deutro-canonical books in the modern canon, are the books of Efther, either the whole, or, at leaft, the feven laft chapters of it: the epiftle to the Hebrews, thofe of James and Jude; the fecond of St. Peter, the fecond and third of St. John, and the Revelations. The deutro canonical parts of books are the hymn of the three Children, the prayer of Azariah, the hiftories of Sufannah, of Bel and the Dragon, the laft chapter of St. Mark, the bloody fweat and appearance of the angel, related in Luke xxii. and the hiftory of the adulterous woman in John viii.

DEUTERONOMY, a canonical book of the Old Teftament, and the laft of the pentateuch of Mofes. See the articles Bible, Canon, and Pentateuch.

This book was called Deuteronomy by the feventy greeks tranflators, as being a recapitulation of the laws before delivered at large.

DEUTEROPOTMI, δευτεροποτμοι, in grecian antiquity, a defignation given to fuch of the Athenians as had been thought dead, and, after the celebration of the funeral rites, unexpectedly recovered. It was unlawful for the deuteropotmi to enter into the temple of the Eumenides, or to be admited to the holy rites, till after they were purified, by being let thro' the lap of a woman's gown, that they might feem to be new born.

DEUTEROSIS, the greek name by which the Jews called their mifchnah, or fecond law. See the article Mischnah.

Eufebius accufes the Jews with corrupting the true fenfe of fcripture with the trifling explanations of their deuterofis. Epiphanius fays, that there were four forts of thefe quoted: the firft under the name of Mofes, the fecond under that of Akiba, the third under that of Adda, or Judah, and the fourth under the name of the fons of the Afmonæans, or Maccabees. It is not eafy to fay, whether the prefent Mifchnah is the fame with any of thefe; whether it contains them all, or only fome part, or whether it be different from them all. St. Jerom fays, that the Hebrews referred their deuterofes to Shammai, and Hillel; he fpeaks of the deuterofes with the utmoft contempt; he looked upon them as a collection of fables, childifh ftuff, and obfcenities.

DEVUIDER, in the manege, is applied to a horfe that, upon working upon volts, makes his fhoulders go too faft for the croupe to follow; fo that, inftead of going upon two heads as he ought, he endeavours to go only upon one. This comes from the refiftance he makes in defending againft the heels; or from the fault of the horfeman, who is too hafty with his hand.

DEUX PONTS, a city of Germany, in the palatinate of the Rhine, fixty miles north eaft of Nancy: eaft longitude 7° 15′, and north latitude 49° 25′.

DEW, a denfe moift vapour, falling on the earth in form of a mifling rain, while the fun is below the horizon.

In the fummer-feafon, when the weather is fair and very dry, and the earth's furface has, for a confiderable time, been parched with the great heat of the fun, then, not only the watery, but likewife other lefs volatile particles, as the oily and faline, are, by the power of the folar rays, carried up into the air, and fill that part of it which lies neareft to the furface of the earth; and fo long as thefe exhalations are kept in agitation by the heat of the fun, fo long nothing of them appears to the eye: but as foon as the folar heat, which at three in the afternoon is the greateft, begins to remit, the air not long after begins to grow cool, though the earth, which retains the heat communicated to it by the fun a thoufand times longer than the air, being ftill hot, continues to exhale the agitated corpufcles: by which means there is collected a white, denfe vapour, which is cool above, but ftill continues warm below. This vapour therefore appears firft in ditches, and watery or marfhy places, whence difperfing itfelf by degrees, it covers the face of the earth, in the evening and night-time, with a cloud, confifting of this kind of particles, which in the morning is again diffipated by the heat of the rifing fun. By this it appears, that dew is a very compound liquid, fo that nothing can be afferted of its nature, which in every circumftance would hold true. In gravelpits, for inftance, and in high, dry, healthy grounds of a large extent, there is collected

collected but a very ſmall quantity of this vapour, and that almoſt intirely watery: whilſt that which is collected about ſtanding waters, fens, marſhes, and fat bituminous grounds, abounding with putrified fiſh, and other animals, is of a quite different nature, and very often pernicious to mankind: whence it is no wonder that chemiſts, in their analyſing of dew, ſhould find ſuch different reſults, that ſcarce any two are agreed about them: ſome dew, that had been collected in a certain part of the earth, has afforded a liquor, by diſtillation, which ſtruck the colours of the rainbow upon glaſs, ſo ſtrong as not to be effaced by friction, alkaline lixiviums, or aqua regia: it alſo burnt like ſpirit of wine: again ſome diſtilled dew, having been digeſted with a gentle heat for eight days, and then rectified ſix times over, till it was exceeding ſubtile, is reported to have broke three glaſs veſſels ſucceſſively, though it ſtill remained perfectly inſipid: again ſome dew is deſcribed to be like a yellowiſh butter, that melts by being rubbed upon the hand, yet grows hard and dry with a moderate heat, being of a fetid odour, and to be found in pretty large lumps in the night, eſpecially in the ſpring and winter. The nature of dew alſo differs ſurprizingly with the different ſeaſons of the year, and the various ſucceſſions of meteors: hence, exceedingly ſmall ſeeds of vegetables, and inviſible eggs of minute animals, with numerous other things coming to be digeſted, fermented, or putrified therein, it muſt afford many very different productions by diſtillation: whence chemiſts have formed very odd opinions about it.

Dew-born, in country affairs, a diſtemper in cattle, being a ſwelling in the body, as much as the ſkin can hold, ſo that ſome beaſts are in danger of burſting. This diſtemper proceeds from the greedineſs of a beaſt to feed, when put into a rank paſture: but commonly when the graſs is full of water. In this caſe the beaſt ſhould be ſtirred up and down, and made to purge well: but the proper cure is bleeding in the tail; then take a grated nutmeg, with an egg, and breaking the top of the ſhell, put out ſo much of the white as you may have room to ſlip the nutmeg into the ſhell; mix them together, and then let ſhell and all be put down the beaſt's throat; that done, walk him up and down, and he ſhall ſoon mend.

Mill-Dew, *rubigo*. See the article Rubigo.

Sun-Dew, *ros-ſolis*, in botany. See the article Ros-solis.

DEXTANS, in roman antiquity, ten ounces, or $\frac{10}{12}$ of their as. See As.

DEXTER, in heraldry, an appellation given to whatever belongs to the right ſide of a ſhield, or coat of arms: thus we ſay, bend-dexter, dexter-point, *&c.* See the articles Bend, Point, *&c.*

DEXTROCHERE, or Destrochere, in heraldry, is applied to the right arm painted in a ſhield, ſometimes naked, ſometimes cloathed, or adorned with a bracelet; and ſometimes armed, or holding ſome moveable, or member uſed in the arms.

DEY, in matters of government, the ſovereign prince of Algiers, anſwering to the bey of Tunis. See the article Bey.

DEYNSE, a town of Flanders, nine miles ſouth weſt of Ghent: eaſt long. 3° 30′, north lat. 51°.

DIA, δια, the beginning of ſeveral terms in medicine, pharmacy, ſurgery, *&c.* Where theſe three letters commence the name of a remedy, unguent, plaſter, *&c.* they ſignify compoſition and mixture, as diapoſma, *&c.*

Dia is alſo the beginning of many terms in the other arts, as diameter, dialogue, *&c.* See the article Diameter.

DIABETES, διαβητης, in phyſic, an exceſſive diſcharge of urine, which comes away crude, and exceeds the quantity of liquids drank.

It proceeds from weakneſs of the kidneys, which are too feeble and lax, eſpecially in thoſe who have been accuſtomed to drink too much.

Liſter obſerves, that a diabetes comes ſlowly on, and is a long while a breeding. In the beginning the mouth is dry, and the ſpittle a little white and frothy; the urine being ſomewhat more than uſual, with a ſmall thirſt. A heat begins to be perceived in the bowels, which is a little pungent; the patient falls away, and the mind is anxious and unſtable. In time the thirſt greatly increaſes, the urine is plentiful, and the body waſtes: when they make water, without intermiſſion, the thirſt is intolerable, and though much is drank, it is not proportionable to the water; when the urine is retained a little while, there is a ſwelling of the loins, ilia, and teſtes, and it comes away with pain. Now death is at hand. The urine is pale, and not ſweet, but more ſweetiſh at laſt than at firſt.

Syden-

Sydenham obferves, that the juices brought into the blood go off by urine: whence the ftrength gradually fails, the body waftes, and its fubftance is drained away: there is a thirft, heat of the bowels, &c.

Strengtheners, moderate aftringents, and a fpecies of hyacinth, with crocus martis, are good in this difeafe, efpecially with anodynes: or japan earth; or the tincture of vitriol of mars; and red wine, with water in a fmall quantity: the drink fhould be fparing, and all exceffes avoided, exercife and friction of the body are ufeful.

Lifter fays, almonds and a milk-diet are proper in this diftemper; as alfo, wine with ginger, allowing in the mean time a draught of milk and water to allay the thirft.

Wallis prefcribes tincture of antimony and lime water, with faffafras, anifeeds, raifins, or liquorice. Briftol-water is reckoned excellent upon thefe occafions: but Morgan fays, that the tincture of cantharides is a medicine that may almoft be depended on for checking, reftraining, and ftopping the immediate flux of urine.

DIABOTANUM, in pharmacy, a plafter prepared of herbs defcribed by Galen, De C. M. P. G. lib. vi. c. 2. It refolves and difcuffes wens.

DIACARTHAMI, in pharmacy, an electuary compofed of fome purgatives with the addition of the pulp of the feed of carthamus, formerly mixed in medicines along with other purgatives, but now wholly out of ufe.

DIACAUSTIC CURVE, a fpecies of cauftic curves formed by refraction. Thus if you imagine an infinite number of rays B A, B M, B D, &c. (plate LXX. fig. 1.) iffuing from the fame luminous point B to be refracted to or from the perpendicular M C, by the given curve A M D, and fo, that C E, the fines of the angles of incidence C M E, be always to C G, the fines of the refracted angles C M G, in a given ratio, then the curve H F N, which touches all the refracted rays, is called the diacauftic, or cauftic by refraction. See the article CAUSTIC CURVE.

DIACELTATESSON, in chemiftry, a name given by Van Helmont, to a purging preparation procured from the fixed flowers of antimony. It is faid by its author to cure all intermittent and continued fevers. It is to be given without any acid, and if it operate too violently, the violence may be ftopped by taking any thing acid. Boerhaave obferves, that he had often given it with good fuccefs, but never with thofe effects which the author afcribes to it, who fays, that it radically cures the gout and fevers, heals ulcers of the larynx, œfophagus and bladder, and purges the body when in perfect health, but not otherwife.

DIACENTROS, a term ufed by Kepler, for the leffer diameter of a planet's orbit.

DIACHALCITIS, in furgery and pharmacy, a plafter compofed of oil, axungia, and chalcitis, which formerly ufed to be applied after the amputation of a cancer, and on many other occafions.

DIACHYLON, in pharmacy, an emollient digeftive plafter, compofed of mucilages or vifcid juices drawn from certain plants. See the article MUCILAGE.

There are feveral plafters defcribed by difpenfatory writers under the name of diachylon, but the following are thofe ordered by the college of phyficians. 1. Simple diachylon, compounded of fine oil, litharge of gold, the mucilages of fenugreek, linfeeds, and marfhmallow roots. 2. Diachylon magnum, the greater diachylon, made of the mucilages of raifins, figs, marfhmallow roots, fenugreek, and linfeeds, birdlime, of the juices of orrice and fquills, of œfypus, of the oils of orrice, camomile and dill, of litharge of gold, of turpentine, of rofin of the pine-tree, and of yellow wax. 3. Diachylon magnum cum gummi, the great diachylon with gums, which confifts of the former with the addition of ftrained galbanum, bdellium, fagapenum, and ammoniacum. 4. Compound diachylon or the mucilage plafter, compofed of yellow wax, the oil of mucilages, gum ammoniac, and common turpentine.

DIACODIUM, in pharmacy, a fyrup prepared from poppy heads. It is alfo called the fyrupus de meconio. As it is of confequence that all the circumftances in the directions for compounding this medicine, be exactly followed, we here give the method of preparing it from the London Difpenfatory. Take of the heads of dried white poppies without their feeds, three pounds and a half, of water fix gallons. Slice the heads and boil them in the water, often ftirring them that they may not burn, till about a third only of the liquor is left, which will be almoft all imbibed by the poppy heads:

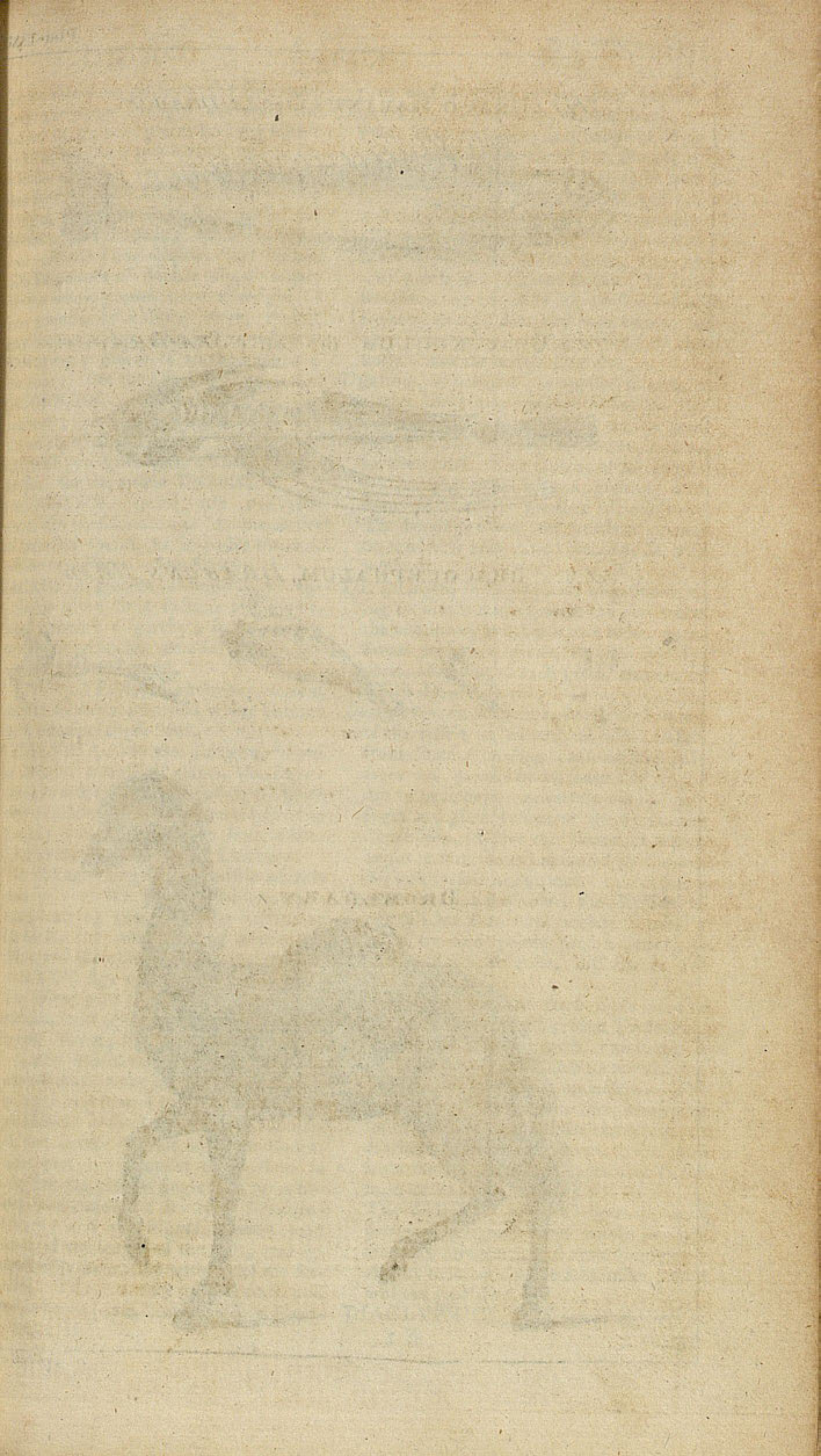


Fig. 1. DRACO MARINUS, the *SEA-DRAGON*.

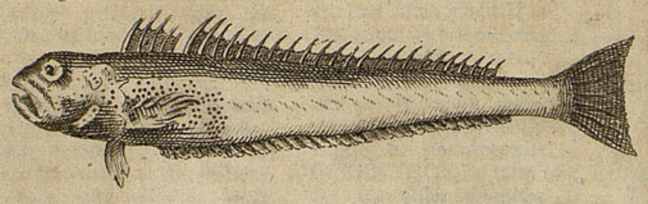


Fig. 2. DRACUNCULUS, the Little *SEA-DRAGON*.

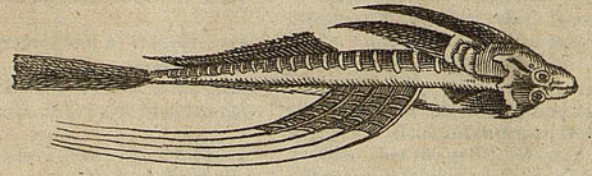
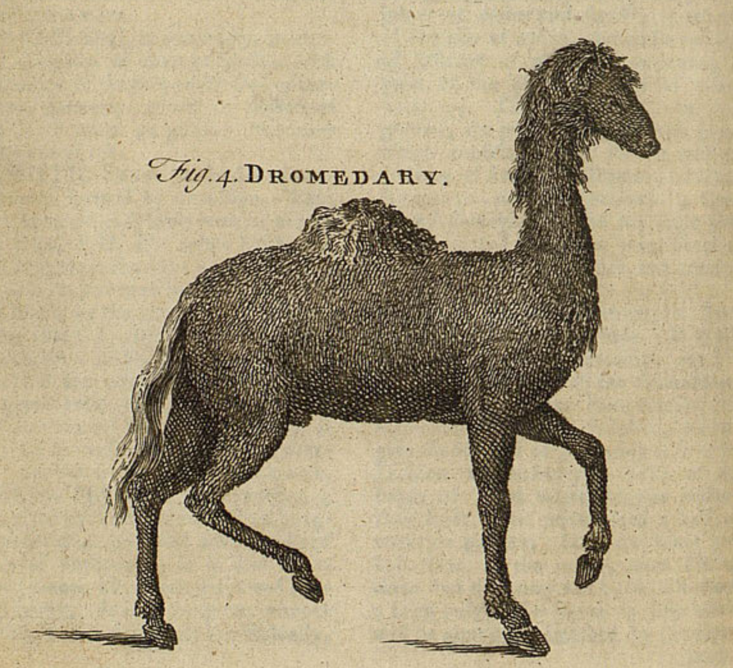


Fig. 3. DRACOCEPHALUM, *DRAGON'S HEAD*.



Fig. 4. DROMEDARY.



T. Jefferys sculp

heads: then take all from the fire, and prefs the liquor ftrongly out from the heads: in the next place, boil the liquor by itfelf, to about two quarts, and ftrain it while hot, firft through a fieve, and then through a thin flannel: fet it by for a night, that what fæces have paffed the ftrainers, may fubfide; next morning pour off the clear liquor, and boil it with fix pounds of double refined fugar, till the whole comes to the weight of nine pounds, or a little more, that it may become a fyrup of a juft confiftence. This fyrup partakes of all the virtues of the poppy. See the article POPPY.

DIACONICON, in church hiftory, an apartment anfwering to our veftry. See the article VESTRY.

DIACOPE, in grammar, the fame with tmefis. See the article TMESIS.

DIACOUSTICS, called alfo DIAPHONICS, the confideration of the properties of refracted found, as it paffes through different mediums. See SOUND.

DIACRII, in grecian antiquity, an appellation given to a faction at Athens, who favoured oligarchy; in oppofition to the pediaci, who were for a pure democratical government.

DIACYDONITES, in pharmacy, a term applied to thofe remedies where quinces are a principal ingredient.

DIADELPHIA, in the linnæan fyftem of botany, a clafs of plants, the feventeenth in order; comprehending all thofe with papilionaceous and hermaphrodite flowers, and leguminous feed-veffels. See PAPILIONACEOUS and LEGUME.

The diftinguifhing characteriftic of this clafs is, that the ftamina adhere together; forming two diffimilar bodies or filaments, the one ftanding above the piftil, and the other furrounding it. See plate XXX. fig. 17.

The lower part of this laft is membranaceous, and of a cylindrical figure, only open above; but towards the top, it is divided into feveral fubulated bodies, whereof thofe in the middle are alternately longer and fhorter by pairs. The upper filament is fingle, altogether fubulated, and covers the flit of the cylindraceous part of the under one. Add to this, that the piftil is fingle; its germ oblong, and rounded; its ftyle, fubulatofiliform; and the ftigma covered with down, of the length of the ftyle, and lying directly below the antheræ of the ftamina. This is a very natural clafs, and comprehends peafe, beans, vetches, liquorice, and a great many other genera.

DIADEM, in antiquity, a head band, or fillet, worn by kings, as a badge of their royalty. It was made of filk, thread, or wool, and tied round the temples and forehead, the ends being tied behind, and let fall on the neck. It was ufually white, and quite plain, though fometimes embroidered with gold, and fet with pearls and precious ftones. In latter times, it came to be twifted round crowns, laurels, *&c.* and even appears to have been worn on divers parts of the body. See the article CROWN.

DIADEM, in heraldry, is applied to certain circles, or rims, ferving to inclofe the crowns of fovereign princes, and to bear the globe and crofs, or the flower de luces for their creft. The crowns of fovereigns are bound, fome with a greater, and fome with a lefs number of diadems. The bandage about the heads of moors on fhields is alfo called diadem, in blazoning.

DIÆRESIS, in furgery, an operation ferving to divide and feparate the part when the continuity is a hindrance to the cure. Some profeffors divide furgery into fix parts, affigning to each greek names, of which diærefis is one.

DIÆRESIS, in medicine, is the confuming of the veffels of an animal body, when from fome corroding caufe certain paffages are made, which naturally ought not to have been; or certain natural paffages are dilated beyond their ordinary dimenfions, fo that the humours which ought to have been contained in the veffels extravafate or run out.

DIÆRESIS, in grammar, the divifion of one fyllable into two, which is ufually noted by two points over a letter, as aulaï inftead of aulæ, diffoliienda for diffolvenda.

DIÆRESIS is alfo the fame with what is otherwife called tmefis. See TMESIS.

DIÆTETÆ, in grecian antiquity, a kind of judges, of which there were two forts, the cleroti and dialacterii. The former were public arbitrators, chofen by lot to determine all caufes exceeding ten drachms, within their own tribe, and from their fentence an appeal lay to the fuperior courts.

The dialacterii, on the contrary, were private arbitrators from whofe fentence there lay no appeal, and accordingly they always took an oath to adminifter juftice without partiality.

DIAGLYPHICE, the art of cutting or engrav-

engraving figures on metals, fuch as feals, intaglias, matrices of letters, &c. or coins for medals. See the articles ENGRAVING and SCULPTURE.

DIAGNOSTIC, in medicine, a term given to thofe figns which indicate the prefent ftate of a difeafe, its nature and caufe. There are two principles upon which the diagnofis of difeafes is founded: the firft depends on a knowledge of the preceding caufes, which are fuch as appear to have produced the fame difeafe before: and the fecond is a knowledge of the difeafe in its own nature, and prefent effects. To the diagnofis of fevers, belongs the knowledge of their various ftages or times, as diftinguifhed into beginning, increafe, height, and declenfion.

DIAGONAL, in geometry, a right line drawn acrofs a quadrilateral figure, from one angle to another, by fome called the diameter, and by others, the diameter of the figure. Thus *a b* in plate LXX. fig. 2. is called a diagonal. It is demonftrable, 1. That every diagonal divides a parallelogram into two equal parts. 2. That two diagonals drawn in any parallelogram bifect each other. 3. A line *f g*, paffing through the middle point of the diagonal of a parallelogram, divides the figure into two equal parts. 4. The diagonal of a fquare is incommenfurable with one of its fides. 5. That the fum of the fquares of the two diagonals of every parallelogram is equal to the fum of the fquares of the four fides. This propofition is of great ufe in the theory of compound motions; for, in an oblique angled parallelogram, the greater diagonal being the fubtenfe of an obtufe, and the leffer of an acute, angle, which is the complement of the former, if the obtufe angle be conceived to grow till it be infinitely great with regard to the acute one, the great diagonal becomes the fum of the two fides, and the leffer one, nothing. Now two contiguous fides of a parallelogram being known, together with the angle they include, it is eafy to find one of the diagonals in numbers, and then the foregoing propofition gives the other. This fecond diagonal is the line that would be defcribed by a body impelled at the fame time by two forces which fhould have the fame ratio to each other, as the contiguous fides have, and act in thofe two directions; and the body would defcribe this diagonal in the fame time, as it would have defcribed either of the contiguous fides in, if only impelled by the force correfponding thereto. See the article COMPOSITION *of Motion*.

DIAGONAL SCALE. See SCALE.

DIAGRAM, in geometry, a fcheme for explaining and demonftrating the properties of any figure, whether triangle, fquare, circle, &c. See the articles TRIANGLE, SQUARE, &c.

DIAGRAM, among antient muficians, the fame with the fcale of the moderns. See the article SCALE.

Its utmoft extent was only two octaves; the loweft note being to the higheft as 1 to 4.

Within this compafs, they had eighteen notes or founds; the names of which, beginning with the loweft, are thefe:

Proflambanomenos, anfwering to our	A	
Hypate hypaton	B ♮	
Parypate hypaton	C	
Lichanos hypaton	D	
Hypate mefon	E	
Parypate mefon	F	
Lichanos mefon	G	
Mefe	a	Mefe
	b ♭	Trite fynemmenon
Paramefe	b ♮	
Trite diezeugmenon	c	Paranete fynemmenon
Paranete diezeugmenon	d	Nete fynemmenon
Nete diezeugmenon	e	
Trite hyperbolæon	f	
Paranete hyperbolæon	g	
Nete hyperbolæon	aa	

Th

This diagram, it is to be obferved, reprefents only the diatonic genus, where the notes or founds are by no means diftinct, the paranete fynemmenon coinciding with the trite diezeugmenon, and the nete fynemmenon with the paranete diezeugmenon. It is alfo obfervable, that fome of the notes ftand nearer together than the reft; the interval between the latter being a tone, and between the former only a femitone. See the article INTERVAL.

DIAGRYDIUM, in pharmacy, a preparation of fcammony, invented by Galen: it confifts in baking the fcammony in a quince, but is at prefent feldom ufed, the fcammony being found not to need any correction. See the article SCAMMONY.

DIAHEXAPLA, or DIAHEXAPTE, among farriers, a compound medicine, fo called from its containing fix ingredients, *viz.* birthwort and gentian roots, juniper-berries, bay-berries, myrrh, and ivory fhavings. It is commended for colds, confumptions, purfinefs, and many other diforders in horfes.

DIAL, or SUN-DIAL, an inftrument ferving to meafure time by means of the fhadow of the fun.

Sun-dials are differently denominated according to their different fituation, and the figure of the furfaces upon which they are defcribed, as horizontal, vertical, equinoctial, polar, direct, erect, declining, inclining, reclining, cylindrical, *&c.* We fhall here proceed to defcribe thefe particular kinds of dials; and explain the philofophical principles on which dialing is founded under the article DIALING.

Dials are diftinguifhed into primary and fecondary.

Primary DIAL, that either drawn on the plane of the horizon, called an horizontal dial; or perpendicular thereto, on the planes either of the meridian, or prime vertical, called a vertical dial; to which are added thofe drawn on the polar and equinoctial planes, though neither horizontal nor vertical.

Equinoctial DIAL, is that defcribed on an equinoctial plane, or a plane reprefenting that of the equinoctial. They are ufually diftinguifhed into upper, which look towards the zenith, and lower, which refpect the nadir. Now as the fun only illumines the upper furface of an equinoctial plane, while he is in our hemifphere, or on the northern fide of the equator, an upper equinoctial dial will only fhew the hour during the fpring and fummer feafon. And again, as the fun only illumines the lower furface of an equinoctial plane, while he is in the fouthern hemifphere, or on the other fide of the equator, a lower equinoctial dial will only fhew the hour in autumn and winter. To have an equinoctial dial therefore that fhall ferve all the year round, the upper and lower muft be joined together; that is, it muft be drawn on each fide of the plane.

To defcribe an upper equinoctial DIAL. From a center C (plate LXX. fig. 3. n° 1.) defcribe a circle A B D E, and by two diameters A D and B E, interfecting each other at right angles, divide it into quadrants A B, B D, D E and E A. Subdivide each quadrant into fix equal parts by the right lines, C I, C II, C III, *&c.* which lines will be hour lines, and thro' the center C drive a ftyle or pin perpendicular to the plane A B D E. The dial thus defcribed being raifed fo as to be in the plane of the equator, the line C XII, in the plane of the meridian, and the point A looking towards the fouth; the fhadow of the ftyle will fhew the hours both of the forenoon and afternoon.

A lower equinoctial DIAL is defcribed in the fame manner, with this exception, that no hour lines are to be drawn beyond that of fix o'clock.

To defcribe an univerfal equinoctial DIAL: join two metal planes A B C D and C D E F, (ibid. n° 2.) fo as to be moveable at the joint. On the upper furface of the plane A B C D defcribe an upper equinoctial dial; and upon the lower, a *lower*, as already directed, and through the center I. drive a ftyle. In the plane D E F C cut a box, and put a magnetical needle G therein; fit on the fame plane a brafs quadrant L H, nicely graduated, and paffing through a hole H cut in the plane A B C D. Now fince this may be fo placed by means of the needle, as that the line I 12 fhall be in the plane of the meridian, and by means of the quadrant fo raifed, as that the angle B C F fhall be equal to the elevation of the equator, it will ferve as a dial in any part of the world. On this dial may be drawn feveral concentric circles, which will fhew the fun's place and declination. Thus divide the ftyle into 100 parts, which being the radius of a circle, take the complement of the declination 5°, 10°, 15°, *&c.* and with the tangent

 of

of thefe degrees defcribe concentric circles, and when the end of the fhadow of the ftyle comes into one of them, it fhews the declination and the fun's place, which may be marked on the circles.

Horizontal DIAL, that defcribed on a plane parallel to the horizon.

To draw the hour lines upon an horizontal DIAL, geometrically, draw a right line N S (*ibid.* n° 3.) for the meridian and hour line of 12, and crofs it with another E W, for the hour line of 6 at right angles in Z: and upon Z as a center defcribe a circle E N W S, reprefenting the horizon, of London, for example, whofe latitude is 51° 32, and likewife this dial plane. Within this circle project the fphere according to your latitude: then fhall the feveral hour circles touching the plane of the horizon give you points to draw the hour lines upon your dial plane. If a ruler therefore is laid to Z, and every one of the points 1, 2, 3, *&c.* 11, 10, 9, *&c.* and ftraight lines drawn, thefe lines fhall be the true hour lines for your horizontal dial. There is nothing required to compleat this dial but to make the height of the ftyle equal to the latitude of the place. Wherefore for the latitude of London take 51° 32′ from your fcale of chords, and fet them upon the horizon from S to A, and draw a line Z A for the ftyle. This fubftyle, upon which the ftyle ftands in all horizontal dials, is the meridian, or hour line of 12.

In large dials, where great accuracy is required, it is beft to determine the lines of the dial by trigonometrical calculation, in which the elevation of the pole of the place being given, the angles which the hour lines make with the meridian in the center of the dial are found by the following canon. As the fine of 90°, is to the fine of the elevation of the pole or latitude of the place; fo is the tangent of each hour's equinoctial diftance from the meridian, to the tangent of the angle required.

Vertical DIAL, that drawn on the plane of a vertical circle. The verticals chiefly ufed are the prime vertical and the meridian, whence arife fouth, north, eaft, weft dials. If the dial refpects the cardinal points of the horizon, it is called *direct*, but if any other vertical be chofen, it is faid to *decline*. Again, if the circle whofe plane is ufed be perpendicular to the horizon, the dial is denominated *erect*; but if the plane be oblique to the horizon, it is faid to *incline* or *recline*.

Erect, direct, fouth or *north* DIAL, is that defcribed on the furface of the prime vertical circle, looking fouthward or northward.

To defcribe the hour lines upon a vertical erect, direct, fouth or north DIAL. Having drawn a right line N S, (*ibid.* n° 4. and 5.) for the meridian, or line of 12, and another at right angles E W, for the horizontal line of the plane, croffing in the point Z; upon Z as a center, defcribe a circle N E S W reprefenting the horizon, and thereon project the fphere. Then draw a line upon your projection to reprefent your plane. Now an erect direct plane, which beholds the fouth, muft needs be in the azimuth circle of eaft and weft, and therefore a right line drawn from eaft to weft fhall reprefent your plane. Having drawn the plane upon the projection, you muft find its pole. Now, this plane E W lying in the azimuth of eaft and weft, its poles muft lie in the azimuth of north and fouth, fo that N is the pole of the north face of this plane, and S of the fouth face, either of which poles are removed 90 degrees from the plane, and a line drawn from the one pole to the other, will cut the plane at right angles in Z. The next thing to be found is the elevation of the pole of the world above the plane. Now P the pole of the world is elevated above this plane E W the quantity of the arch of the meridian Z P. To find the quantity of which, take the diftance Z P in your compaffes, and meafure it upon the fcale of half tangents, and you will find it to be equal to the complement of the latitude. Then as for the hour diftances upon the plane, they are found thus. Lay a ruler to N, the pole of the plane, and to the feveral points 1, 2, 3, *&c.* 11, 10, 9, *&c.* where the hour circles of the projection cut the plane, and where the ruler cuts the primitive circle make fmall * * *: and lines drawn from the center Z, through thefe ftars, fhall be the true hour lines upon the dial plane. The height of the pole above the plane being equal to the complement of the latitude, take that in degrees from a fcale of chords and fet them from S to B, and draw a line Z B for the ftyle, which muft ftand upon the meridian, and on the fouth face muft point downwards to the fouth pole,

pole, and on the north face upwards to the north pole, as in n° 5.

To draw this dial trigonometrically, say, as the radius to the co-fine of the latitude, fo is the tangent of 15° the first hour's equinoctial distance, to the tangent of the first hour's distance on the plane.

Erect, direct, east or west Dial, that described on the plane of the meridian, looking to the east or to the west.

To describe an erect, direct, east or west Dial. Let ABCD, plate LXX. LXXI. n° 6 and 7, be the dial plane. 1. Upon the point C at the lowermost corner, if it be an east dial, or upon the point D, at the other lowermost corner, if it be a west dial, with 60 degrees of a line of chords, describe an obscure arch of a circle EF. Then from the same line of chords take the complement of the latitude of the place, which is also the elevation of the equinoctial above the horizon; and set that distance upon the arch from E to F, and draw the line CFA quite through the plane. This line will represent the equinoctial circle. 2. That you may the better proportion your style to your plane, and that all the hours may come on, and be at a convenient distance from one another, assume two points in the equinoctial line, one towards the end of C for the hour of XI, in the east dial, or of I in the west dial, as the point G; and another towards the other end thereof, for the hour of VI, as the point H; and through these two points G and H, draw two lines at right angles to the equinoctial for the hour lines of XI and VI o'clock. 3. Upon the point G with 60 degrees of the line of chords, describe an obscure arch of a circle, below the equinoctial line, as IK, setting thereon 15° of your line of chords from I to K, and draw the obscure line GKL extending it till it cut the hour line of VI in the point L; so shall the distance LH be the heighth of the perpendicular style proportioned to this plane. 4. Open your compasses to 60° of your line of chords, and setting one foot in the point L with the other, describe an obscure arch of a circle MN between the hour line of VI and the line GL. 5. Divide the arch MN into five equal parts, at the points ⊙ ⊙ ⊙ ⊙ ⊙, and lay a ruler from L to each of these points, and the ruler will cut the equinoctial line CH in the points * * * *, through which points draw right lines parallel to the hour line of VI, as the lines VII * VII, VIII * VIII, IX * IX, X * X, and they will be the true hour lines of an east dial from six in the morning to eleven before noon. 6. For the hour lines before VI, namely, of IV and V in the morning, you may put them on by transferring the same distances upon the equinoctial line before VI, as there is between VI, and the hour lines of VII and VIII, after VI. and through these points draw lines parallel to the hour line of VI, and they will be the hour lines of IV and V in the morning. 7. For the style of east or west dials it may be either a straight pointed pin or wire exactly of the length of the line HL, fixed in the point H, or some other part of the line of VI, perpendicularly to the plane, which will shew the true hour only by the shadow of the very top, as in the west dial n° 7; or, which is better, it may be a plate of brass of the same breadth with the distance between the hour lines of VI and IX upon the equinoctial, as in the east dial n° 6, which plate being set perpendicularly upon the hour line of VI, will shew the hour by the shadow of the upper edge. 8. If you would insert the halves and quarters of hours, divide each space between ⊙ and ⊙ on the arch MN into four equal parts, and so transfer them to the equinoctial circle, as you did the whole hours. In an east and west dial every thing is the same, with this difference only, that whereas the arch EF in the east dial, through which the equinoctial passes, was described on the right hand of the plane upon the center C; in the west dial it must be described on the left hand on the center D; and the hour lines of IV, V, VI, VII, VIII, IX, X, XI in the forenoon on the east dial, must be VIII, VII, VI, V, IV, III, II, I in the afternoon on the west dial.

Polar Dial, that described on a plane passing through the poles of the world, and the east and west points of the horizon, denominated *upper* or *lower*, according as it looks up towards the zenith, or down towards the nadir. It is therefore inclined to the horizon in an angle equal to the elevation of the pole.

To draw an upper polar Dial. Draw a right line AB (n° 10) parallel to the horizon; and if the plane be immoveable,

able, find the meridian line C E. Divide C E into two equal parts, and thro' C draw a right line F G parallel to A B. Then from the center D, with the interval D E, describe a quadrant, which divide into six equal parts; and from the center D, through the several points of division, draw right lines D 1, D 2, D 3, D 4, D 5, and set off the intervals E 1, E 2, E 3, E 4, E 5, contrary way, *viz.* E 11, 10, 9, 8, 7. From the points 5, 4, 3, 2, 1, raise perpendiculars, meeting the line F G in the correspondent points. Lastly, in D erect a perpendicular style equal to D E, or on two equal pieces, E, C, fix a cross iron rod, then will 12, 12; 1, 1; 2, 2; 3, 3, *&c.* be hour lines to be pointed out at the proper times by the shadow of the indices. A lower polar dial is made by putting out the hours of the forenoon 9, 10, 11, and those of the afternoon 1, 2, 3, with the noon-hour 12 itself, and only leaving the hours 4 and 5 in the morning and 7 and 8 in the afternoon.

Secondary DIAL, that drawn on the plane of other circles than the horizon, prime vertical, equinoctial, and polar circles; or that which either declines, inclines, reclines, or deinclines.

Declining DIALS are erect or vertical dials, which cut either the plane of the prime vertical, or of the horizon at oblique angles. They are of very great use, as the walls of houses, upon which dials are frequently drawn, commonly deviate from the cardinal points.

To describe a vertical DIAL, *declining from the south to the east, or west, trigonometrically.* In order to do this, 1. The height of the pole or style above the plane must be found. 2. The deflexion or substyle's distance from the meridian. And 3. The plane's difference of longitude. All which are parts of the spherical triangle P R Z, (n° 8.) right angled at R, in which are given the side P Z, equal to the complement of the latitude of the place; the angle P Z R, the complement of the plane's declination; and the right angle at R. From these three data are found. 1. The height of the style above the plane by this canon.

As the sine of 90°
Is to the sine complement of the latitude,
So is the sine complement of the plane's declination
To the sine of the height of the style.

2. The distance of the substyle from the meridian by this canon.

As the sine of 90°
To the sine of the plane's declination,
So is the tangent of the complement of the latitude of the place
To the tangent of the substyle's distance from the meridian.

3. To find the plane's difference of longitude, say,

As the sine of the complement of latitude
To the sine of 90°,
So is the sine of the substyle's distance from the meridian
To the sine of the plane's difference of longitude.

4. To find the angle that each hour makes with the substyle, say,

As the sine of 90°
To the sine of the height of the pole above the plane,
So is the tangent of the difference of the sun's distance from the meridian and the difference of longitudes
To the tangent of the angle required.

An example of a north dial declining east, which is only a south dial inverted, may be seen in (n° 9.)

Inclined DIALS are those delineated on planes inclining towards the southern side of the horizon in an angle either greater or less than the equinoctial plane.

To draw an inclined DIAL. The inclination of the plane, as D C, (n° 11.) being found by a declinator, as taught under the article DECLINATOR, if it fall between the equinoctial plane C E, and the vertical one C B, so as that the angle of inclination D C A be greater than the elevation of the equator E C A, on the upper side draw a *north* dial, and on the lower a *south* dial to an elevation of the equator, which is equal to the aggregate of the elevation of the equator of the given place, and the complement of the inclination to a quadrant. If the inclined plane C F fall between the horizontal one C A, and the equinoctial one C E, so as that the angle of inclination F C A is less than the elevation of the equator E C A, describe an horizontal dial to an elevation of the pole equal to the aggregate of the elevation of the pole of the given place, and the inclination of the plane. See the article *Horizontal*-DIAL.

Inclined dials are drawn after the same manner as primary dials, except that the index in the former case must be fitted under the angle A D C, and in the latter, under the angle D F C, and that the distance of the center of the dial from the line of contingency is in the former case D C, and in the latter F C.

Reclining DIALS, those delineated on planes reclining backwards from the zenith towards the north, in an angle greater or less than the polar plane.

To describe a reclining DIAL. If the reclined plane H C, (n° 11.) fall between the vertical plane B C, and the polar plane I C, so as that the angle of reclination B C H is less than the distance of the pole from the zenith B C I, describe two vertical south and north dials to an elevation of the equator equal to the difference between the elevation of the equator of the given place, and the angle of reclination. See *vertical, south and north* DIAL.

If the reclined plane, as K C, fall between the polar plane I C, and the horizontal one C L, so as that the angle of reclination B C K is greater than the distance of the pole from the zenith I C B, describe an horizontal dial thereon to an elevation of the pole equal to the difference between the angle of reclination, and the elevation of the equator of the given place. See *Horizontal* DIAL.

De-inclined DIALS are those which both decline and incline, or recline. The use of these being very rare, we shall not trouble the reader with a description of them.

Construction of an universal inclined, horizontal and equinoctial DIAL. This instrument consists of two plates of brass, or other solid matter, whereof the under one A (n° 12.) is hollowed about the middle, to receive a compass fastened underneath with screws. The plate B is moveable by means of a strong joint at C. Upon this plate is drawn a horizontal dial for some latitude greater than any of those the dial is to be used in, with a style E proportionable to that latitude. For when the plane B is raised by means of the quadrant D, the horizontal plane must always have a less latitude than that the dial is made for, otherwise the axis of the style will have an elevation too little. Instead of the quadrant D is generally placed an arch from the equator to 60° numbered downwards, 60 being at the bottom, and for this latitude of 60°, the horizontal dial is commonly drawn. The arch of 60° is fastened by two small tenons, and may be laid down upon the plate A, as likewise may the style upon the plate B, and both of these are kept upright by means of little springs underneath the plates.

The use of the inclined horizontal DIAL. Raise the upper plate B to the degree of latitude of the place where you are, by means of the gradations on the quadrant D. Then if the plane A be set horizontal, so that the needle of the compass settles over its line of declination, the shadow of the axis will shew the hour of the day.

Use of the equinoctial DIAL. You must place the edge of the equinoctial circle H B I to the degree of the elevation of the pole by means of the quadrant, and if the dial be set north and south by means of the compass, the shadow of the style will shew the hour of the day at all times of the year, even when the sun is in the equinoctial, because the circle is hollowed.

Ring DIAL, a kind of dial, consisting of a brass ring, seldom exceeding two inches in diameter, and one third of an inch in breadth. In a point of this ring there is a hole, through which the sun beams being received, make a lucid speck on the concavity of the opposite semicircle, which gives the hour of the day in the division marked therein. But it only holds good about the times of the equinox, unless the hole is made moveable, and the days of the month are marked on the convex side of the ring. In this case the dial can be rectified for any time, and will shew the hour of the day throughout the year.

To use it, put the moveable hole to the day of the month, then suspending it by the little ring, turn it towards the sun till his rays point out the hour among the divisions on the inside.

Universal or astronomical ring-DIAL, a dial serving to shew the hour of the day in any part of the earth; whereas the former is confined to a certain latitude. It is composed of two rings, or flat circles, from two to six inches in diameter, and their breadth proportional. The outward ring H R E P (plate LXXI. fig. 13.) represents the meridian of the place of the observer, and contains two divisions of

of 90° each, as HR and EP diametrically opposite to each other, the one serving from the equator to the north pole, and the other from the equator to the south. The inner ring BC represents the equator, and turns exactly within the outward ring, by means of two pivots at the points of the hours of 12. A cursor N composed of two little pieces, slides along an aperture, in the middle of the bridge I, which cursor has a small hole to admit the rays of the sun. The middle of this bridge represents the axis of the world, and its two extremities the two poles; on one side of it are drawn the signs of the zodiac, and on the other, the days of the month. On the edge of the meridian slides a piece *h a*, with a ring I, fitted to it, by which the instrument is to be suspended during the observation. This ring represents the zenith.

Use of the universal ring-DIAL. Place the line on the middle of the sliding piece, immediately below the ring, to the latitude of the place, and fix the line crossing the hole of the cursor to the day of the month, or degree of the sign in which the sun then is. Open the instrument so, that the two rings be at right angles to each other, and suspend it by the ring I: turn the flat side of the bridge towards the sun, so that his rays coming through the little hole in the middle of the cursor fall exactly on a line drawn round the middle of the concave surface of the interior ring, where it will point out the hour. Let it be observed, however, that this dial will not shew the hour of 12, because the outer circle being then in the plane of the meridian, hinders the sun's rays from falling on the inner. Neither will it shew the hour when the sun is in the equinoctial, for then his rays fall parallel to the plane of the inner circle.

Quadrantal DIAL, or HORODICTIC QUADRANT. See the article QUADRANT.

Reflecting DIAL, a sort of dial shewing the hour of the day by means of a thin piece of looking-glass plate, so placed, as to reflect the sun's rays on the top of a ceiling, where the hour-lines are drawn.

Nocturnal DIAL, that which shews the hours of the night, of which there are two kinds, lunar and sidereal.

Lunar, or moon-DIAL, shews the hour of the night by means of the shadow of the moon, projected from an index.

To describe a horizontal moon-DIAL. Draw first a horizontal sun-dial. 2. Erect two lines AB, CD, (plate LXXII. fig. 1.) perpendicular to the line of 12 o'clock; and dividing the interval GF into twelve equal parts, draw lines parallel through the several points of division. 3. If the first line CD be appropriated to the day of the new moon, and the second line to the day when the moon comes later to the meridian than the sun by one hour, and so the last line AB correspond with the day of full-moon, the intersections of these lines with the hour-lines will give points, through which to draw a curve line, 12, 12, for the meridian line of the moon. 4. In the same manner determine the other hour lines 1, 1; 2, 2; 3, 3, &c. which the shadow of the moon projected from the style of the dial, intersects at the respective hours. 5. Blot out the hour lines of the sun-dial, together with the perpendiculars, by means of which the lunar hours were drawn, and divide the interval GF by other parallel lines into fifteen equal parts, because there are nearly fifteen days between new moon and full moon. Lastly, to these lines write the several days of the moon's age. Now the moon's age being learnt from the calendar, the intersection of the line of the moon's age, with the lunar horary lines, will give the hour of the night.

We may likewise find the hour of the night by a sun-dial. Thus, observe the hour which the shadow of the index points at by moon-light: find the moon's age in the calendar; multiply the number of days by $\frac{4}{5}$ and the product is the number of hours to be added to the hour shewn by the shadow, to give the hour required. But if this number exceed 12, then twelve hours are to be subtracted, and the remainder will be the hour required.

DIALS *without centers*, those whose hour-lines converge so slowly, that the center they converge towards cannot be expressed on the given plane. Horizontal dials of this kind are to be made for places, the elevation of whose pole is either very great or very small; and vertical dials without centers are for places, which have the pole very much elevated.

Furniture of DIALS. See FURNITURE.

DIALECT, διαλεκτος, an appellation given to the language of a province, in so

so far as it differs from that of the whole kingdom. The term, however, is more particularly used in speaking of the antient greek, whereof there were four dialects, the attic, ionic, æolic, and doric, each of which was a perfect language in its kind, that took place in certain countries, and had peculiar beauties.

In Great Britain, besides the grand diversity of english and scotch, almost every county has a dialect of its own, all differing considerably in pronunciation, accent, and tone, altho' one and the same language.

The way of the Gileadites proving the Ephraimites, by the pronunciation of *schibboleth*, or *sibboleth*, with *schin*, or *samech*, is well known. So the Flemings are said to prove whether a man be a native of France, or not, by bidding him pronounce *ach ten tachtentick*, which they pronounce *act en tactentick*, as being unable to articulate the aspirate *ch*.

DIALECTICS, *dialectica*, in the literary history of the antients, that branch of logics which taught the rules and modes of reasoning. See the article LOGIC.

DIALIA, and FLAMEN DIALIS, in roman antiquity. See FLAMEN.

DIALLING, the art of constructing all manner of dials. See DIAL.

Having described the most useful dials under the word DIAL, we now proceed to explain the philosophic principles of the art of dialling. In order to this, therefore, we are to consider, that as the time which passes between any meridian's leaving the sun, and returning to it again, is divided into 24 hours, so if we conceive a sphere to be constructed with 24 of these meridians, the sun will orderly come upon one of them at the beginning of every hour. Such a sphere may be represented by the figure P D S B (plate LXXII. fig. 2. n° 1.) where the several meridians are represented by P 1 S, P 2 S, P 3 S, and so on to 24 in all: since these meridians divide the equinoctial into 24 equal parts, each part will contain just 15°, because 15×24=360, the whole circle; and since all the meridians pass through the poles of the world, the planes of those meridians all intersect each other in one common line P S, which is the axis of the sphere, therefore the said axis P S is in the plane of each of the 12 meridians. Suppose Z to be the zenith of any place, and D W B E the plane of the horizon fixed within the sphere, constructed with the 12 meridians, 1, 1; 2, 2; 3, 3; 4, 4; &c. then will the axis of the sphere P S pass through the center of the plane at N; so that one half N P will be above the plane, and the other half N S below it. Suppose now this dialling sphere to be suspended by the point Z, and moved about so as to have the points D and B exactly in the south and north points of the horizon, and E and W in the east and west points, then will the sphere have a situation every way similar to that of the earth and heavens with respect to the given place, and the axis of the sphere to that of the earth. The sun, therefore, shining on such a sphere, will be attended with all the same incidents, and produce all the same effects as would happen if the said sphere were at the center of the earth, or the center N of the sphere coincided with the center of the earth, because the distance between the surface and center of the earth is insensible at the distance of the sun. Now it is evident, as the sun revolves about such a sphere, it will every hour be upon one half or other of the 12 hour circles, *viz.* from midnight to noon, it will be on those parts of the circles which are in the eastern hemisphere; and from noon to midnight, it will pass over all those in the western. It is also farther evident, that while the sun is in the eastern hemisphere, it will be first below and then above the plane of the horizon, and *vice versa* on the other side. Again, when the sun is upon any of these hour circles, by shining upon the axis it causes it to cast a shadow on the contrary side, on the plane of the horizon, on the lower or upper surface, as it is below or above the said plane. This shadow of the axis will be precisely in the line in which the plane of the hour-circle would intersect the plane of the horizon: if, therefore, lines were drawn through the center N, joining the points on each side the plane where the hour-circles touch it, as 4 N 4, 5 N 5, 6 N 6, &c. the shadow of the axis will fall on those lines at the beginning of each respective hour, and thereby indicate the hour-circle the sun is in for every hour of the day. These lines are properly called hour-lines, and among the rest that which represents the hour of 12 at noon is N B, half the meridian line D B; whence it appears that the hour-lines N 1, N 2, N 3, &c. which serve for the afternoon, lie on the east side of the plane, and are numbered from the north to the east; and on the contrary.

It alſo appears, that as the ſun's altitude above the plane is greater or leſs, the number of hour-circles the ſun will poſſeſs above the horizontal plane will be alſo greater or leſs. Thus when the ſun is at S in the equinoctial, its diurnal path for that day being the equinoctial circle itſelf Æ E Q W, it is plain, ſince the arch Æ E = E Q, the ſun will apply to ſix hour-circles below the horizon, and to ſix above it, in each half of the day; and conſequently that on this day the ſhadow will occupy but 12 of the hour-lines on each ſurface of the plane, beginning and ending at ſix. But when the ſun is in the tropic of cancer, its diurnal path for that day being the tropic itſelf, T C R F, it is manifeſt the ſun in the forenoon aſcends above the plane in paſſing between the hour-circles of 3 and 4 in the morning, and deſcends below it in the afternoon between the hours of 8 and 9: therefore on the ſummer tropic the ſhadow will paſs over 16 of thoſe hour-lines. On the contrary, when the ſun is in the winter tropic at O, its path being then O G I H, it riſes above the plane between 8 and 9, and leaves it between 3 and 4.

From what has been ſaid, it is evident that if the circles be ſuppoſed removed, and only the horizontal plane remain, with the half of the axis N P, (*ibid.* n° 2.) above it in the ſame poſition as before, then ſhould we have conſtituted a horizontal dial, every way the ſame with thoſe in common uſe, with only the addition of a ſubſtyle P O, to render the ſtyle N P very firm. Hence appears the reaſon why the gnomon or ſtyle N P, in thoſe dials in our latitude, is always directed to the north pole, and always contains ſuch an angle P N O, with the hour line of 12, N B, as is equal to the latitude of the place. Laſtly, the reaſon appears why the number of hour-lines on theſe dials exceeds not 16, and are all drawn from 6 to 12 and 6 again, on the northern part, the reſt on the ſouthern; and why the hour-line of 6 lies directly eaſt and weſt, as that of 12 does north and ſouth.

If a plane be fixed within the ſame ſphere in a vertical poſition, or perpendicular to the horizon, and coinciding with the plane of the prime vertical, that is, facing full ſouth and north; then will the axis P S (*ibid.* n° 3.) ſtill paſs through the center of the plane N; and the lower ſemi-axis N S will by its ſhadow mark out the hour-lines on the ſouthern ſurface, and the upper ſemi-axis N P will do the ſame on the northern. Theſe hour-lines are determined in the ſame manner as thoſe on the horizontal dial; and it is plain the ſun cannot come on the ſouthern face of this plane before ſix in the morning, nor ſhine on it after ſix in the evening. It is alſo evident, that all the hours before ſix in the morning, and after 6 at night, will be ſhewn on the northern face or ſide of this plane, for the time of the ſun's being above the horizon in any place. Hence the reaſon of a direct ſouth and north vertical dial eaſily appears, both which are repreſented in fig. 3. n° 4 and 5 of plate LXX.

The gnomon NS (pl. LXXII. fig. 2. n° 3.) contains an angle S N F = Z N P with the meridian or hour-line of 12, *viz.* Z F, which is exactly the complement of PNB to 90°; hence the elevation of the gnomon in vertical dials is equal to the complement of the latitude of the place. The principles of a direct ſouth dial being underſtood, it will be eaſy to underſtand thoſe of a dial which does not face the ſouth or north directly, but declines therefrom any number of degrees from eaſt to weſt. But we refer the reader, who requires more ample inſtruction on this head, to the authors who have treated profeſſedly of dialling; the moſt remarkable of theſe, beſides Wolfius, to whom we are indebted for a great part of the article Dial, are Clavius; Comandine, De Horologiorum deſcriptione; Joann. Bapt. Benedictus, De Gnomonum Umbrarumque ſolarium uſu; Geo. Schomberg, Exegeſis fundamentorum; Gnomonicorum; Solomon de Caus, Traite des Horologes ſolaires; Deſargues, Maniere univerſelle pour poſer l'eſſieu, & placer les heures, & autres choſes, aux cadrans ſolaires; Kircher's Ars magna Lucis & Umbræ; Leybourn's Art of Dialling; Ozanam's Dialling; and M. De la Hire's Gnomonique, ou l'art de tracer les cadrans, avec les demonſtrations.

Dialling-globe, an inſtrument of braſs or wood, with a plane fitted to the horizon, and an index, ſo contrived as to give a clear illuſtration of the principles on which dials are made. See the preceding article.

Dialling-lines, or scales, are graduated lines placed on rulers, or the edges of quadrants and other inſtruments, to expedite the conſtruction of dials. These are,

are, 1. A scale of six hours, which is only a double tangent, or two lines of tangents each of 45°, set together in the middle, and equal to the whole line of sines, with the declination set against the meridian altitudes in the latitude of the place. 2. A line of latitudes, which is fitted to the hour-scale, and is made by this canon. As the radius : to the chord of 90° : : so are the tangents of each respective degree of the line of latitudes : to the tangents of other arcs. And then the natural sines of these arches are the numbers, which taken from a diagonal scale of equal parts, shall graduate the divisions of the line of latitudes to any radius. The lines of hours and latitudes are general, for pricking down all dials with centers.

The other scales are particular, and give the several requisites for all upright declining dials by inspection. They are, 1. A line of chords. 2. A line for the substyle's distance from the meridian. 3. A line for the style's height. 4. A line of the angle of 12 and 6. 5. A line of inclination of meridians.

Dialling-sphere, an instrument made of brass, with several semi-circles sliding over each other upon a moveable horizon; serving to demonstrate the nature of spherical triangles, as well as to give the true idea of drawing dials on all sorts of planes. See the article Dialling.

Dialling, among miners, the same with plumming. See Plumming.

DIALOGISM, διαλογισμὸς, in rhetoric, is used for the soliloquy of persons deliberating with themselves, as the following of Juno, in the first Æneid of Virgil:

mene incepto desistere victam?
Nec posse Italia Teucrorum avertere regem?
Quippe vetor fatis? &c.

In this sense, it is distinguished from dialogue. See the article Dialogue.

Dialogism is also, in a more extensive sense, taken for discourse in general, whether held by a person alone, or in company.

DIALOGUE, in matters of literature, a conversation between two or more persons, either by writing or by word of mouth.

Dialogue appears to be the most antient form of writing, and is greatly recommended by several authors. The archbishop of Cambray, at the head of his Pastoral Instruction, gives an account of the advantages of dialogue. The Holy Spirit has thought proper to teach us in dialogue, *viz.* patience, in the book of Job; and love of God, in the Canticles. The Dies Caniculares of Simon Maiolus, concerning various subjects of nature, is by the way of dialogue. That learned philosopher Claud Berirgardus, a man of most profound judgment and ingenuity, wrote his Circulus Pisanus, wherein he lays open the most impenetrable secrets of all natural philosophy, by way of dialogue between Charilæus, as defender of the peripatetics, and Aristæus, as maintaining the principles of Anaximander. Also Joh. Bodinus, in his Physics, as well as in all the rest of his writings, treats, in his Theatrum universæ naturæ, of the various subjects of nature, in the form of a dialogue: and indeed under this appearance, and in this method of style, he has better opportunities, by way of objections, to introduce his own paradoxes, and the rest of his monstrous opinions. We have also several writers of travels, &c. in this way, both in the french and german languages; and not a few medical and chemical authors, who have chose to instruct by way of dialogue.

Among religious writers, Justin Martyr opened this way in his controversy against the Jews. Minutius Felix followed it, in his against the idolaters. It is in this form that Origen judged he could best refute the error of Marcian. Many others might be mentioned who thought it no diminution to the majesty of the mysteries of faith, to maintain them by the familiarity of dialogue.

Dialogue, in music, a composition for at least two voices, or two instruments, which answer one another, and which frequently uniting at the close, make a trio with the thorough bass.

These are very much used by the Italians in their operas, oratorios, serenatas, &c.

DIALTHÆA, in pharmacy, an unguent much used as a resolvent, so called from althæa, or marsh-mallows, which is the principal ingredient in it. See the article Althæa.

This ointment consists also of linseed and fenugreek seed; the other ingredients are common oil, wax, resin, and turpentine. It is applied by rubbing it on the part affected.

DIALYSIS, in grammar, a mark or character, consisting of two points, ¨, placed over two vowels of a word, in order to separate them, because otherwise they

would make a diphthong, as mofaïc, &c. See the article DIÆRESIS.

DIAMARGARITON, in pharmacy, the name of an antidote in Myrepfus, §. i. cap. 37. in which pearls are a principal ingredient.

There are two kinds of the diamargariton, the hot and the cold, but neither of them are at prefent ufed.

The hot diamargariton, is a powder compofed of pearls, pellitory, ginger, cinnamon, and feveral other hot ingredients.

Cold diamargariton is a folid electuary, compofed of pearls ground fine, and white fugar diffolved in rofe-water, or that of buglofs, and boiled to a confiftence.

Compound cold diamargariton is a powder made of pearls, red rofes, flowers of nenuphar and violet, lignum aloes, red and citron fantal, tormentil root, &c.

DIAMASTIGOSIS, διαμαστίγωσις, in grecian antiquity, a folemnity at Sparta, in honour of Diana Orthia, wherein the children of the moft diftinguifhed families were wont to flafh and tear each others bodies with rods, before the altar of the goddefs: the parents of the children, being always prefent, ufed to animate and excite them not to give the leaft fign of pain or concern; and indeed fo great was the bravery and refolution of the boys, that feldom or ever any cry or groan was heard to proceed from any of them, though they frequently whipped one another to death. The defign of this cuftom was, no doubt, to fortify the children betimes, and harden them againft wounds, bruifes, &c.

DIAMETER, in geometry, a right line paffing through the center of a circle, and terminated at each fide by the circumference thereof. See the article CIRCLE.

The chief properties of the diameter are, that it divides the circumference of a circle into two equal parts: hence we have a method of defcribing a femicircle upon any line, affuming its middle point for the center. The diameter is the greateft of all chords.

For finding the ratio of the diameter to the circumference, fee CIRCLE.

DIAMETER *of a curve* is a right line AC (plate LXXII. fig. 3.) bifecting the right lines DE, DE, drawn parallel to one another; and are either of a finite or infinite length. Though a right line, bifecting all parallel lines drawn from one point of a curve to another, is taken in a ftrict fenfe only for the diameter of a curve line, yet it may not be amifs, more generally, to define a diameter, in faying that it is that line, whether right or curve, which bifects all parallels drawn from one point of a curve to another, fo that, according to this, every curve will have a diameter: and thence fir Ifaac Newton's curves of the fecond order have all either a right-lined diameter, or elfe the curves of fome one of the conic fections for diameters: and many geometrical curves of the higher orders may alfo have for diameter curves of more inferior ones, and that *ad infinitum*. See the articles CURVE and CONIC SECTIONS.

DIAMETER CONJUGATE. See the article CONJUGATE DIAMETER.

DIAMETER *of a fphere* is the diameter of the femicircle, by whofe rotation the fphere is generated; in which fenfe it is the fame with axis. See the article AXIS.

DIAMETER *of gravity*, in any furface or folid, is that line in which the center of gravity is placed. See CENTER.

DIAMETER, in aftronomy. The diameters of the planets are either apparent or real: the apparent diameters are fuch as they appear to the eye; and being meafured by a micrometer, are found different in different circumftances and parts of their orbit. See the article PLANET.

The apparent diameters of the planets meafured with a micrometer, are found different in different circumftances and parts of their orbits, as expreffed in the following table.

Apparent Diameters of the Planets.

		Leaft.			Mean.			Greateft.		
According to De la Hire	Sun	31′	38″	0‴	32′	1″	0‴	32′	43″	0‴
	Moon	29	30	0	31	30	0	33	30	0
According to Hevelius	Saturn	0	14	10	0	16	2	0	19	40
	Jupiter	0	14	36	0	18	2	0	24	22
	Mars	0	2	46	0	5	2	0	20	50
	Venus	0	9	30	0	16	46	1	5	58
	Mercury	0	4	4	0	6	3	0	11	48

The

The leaſt apparent diameter of the planets, according to Huygens, are as follows: Saturn 30″, his ring 1′ 8″, Jupiter 1′ 4″, Mars 30″, Venus 1′ 25″.

The real diameters of the planets are ſuch as they are in themſelves, and are laid down by aſtronomers, as expreſſed in the following table.

A Table of the real Diameters of the Sun and primary Planets in Britiſh Miles.

The diameter of		
the Sun	763,460	britiſh miles.
Mercury	4,240	
Venus	7,906	
the Earth	7,970	
Mars	4,444	
Jupiter	81,155	
Saturn	67,870	

For the real diameters of the ſecondary planets, ſee MOON and SATELLITE.

DIAMETER *of a column*, in architecture, is its thickneſs juſt above the baſe. See the article COLUMN.

From this the module is taken, which meaſures all the other parts of a column. See the article MODULE.

DIAMETER *of the diminution of columns*, that taken from the top of the ſhaft. See the article DIMINUTION.

DIAMETER *of the ſwelling*, that taken at the height of one third from the baſe.

DIAMOND, *adamas*, in natural hiſtory, a genus of precious ſtones, of a fine pellucid ſubſtance, of great hardneſs, never fouled by any admixture of earthy or any other coarſe matter, ſuſceptible of elegant tinges from metalline particles, giving fire with ſteel, not fermenting with acid menſtruums, ſcarcely calcinable by any degree of fire, and of one ſimple and permanent appearance in all lights.

This is the moſt valuable and hardeſt of all gems, and, though found of different ſhapes, and ſometimes accidentally tinged to ſeveral colours; yet ever carries the ſame diſtinguiſhing characters, and is very evidently in all thoſe ſtates the ſame body. It is, when pure, perfectly clear and pellucid as the pureſt water, and is eminently diſtinguiſhed from all other ſubſtances, by its vivid ſplendor, and the brightneſs of its reflections. It is extremely various in ſhape and ſize, being found in the greateſt quantity very ſmall, and the larger ones extremely ſeldom met with; the largeſt diamond certainly known ever to have been found is that in the poſſeſſion of the Great Mogul, which weighs 279 carats, and is computed to be worth 779,244 l.

The diamond has certainly one proper and determinate figure, into which it naturally muſt concrete, when in a ſtate of reſt, and impeded by no other accident in its formation: the true figure then is an inequilateral octohedron; and wherever it has concreted in a perfect manner, and without any interrupting accidents, it has always formed itſelf into this figure; and often in this its ſeveral ſurfaces are as bright as if poliſhed by art: but, as in common ſalt, though its figure be pyramidal, yet very eaſy accidents can determine it into cubes and parallelopipeds; ſo the diamond has often, in the ſtate of formation, been thrown into two other figures, both alſo ſeeming regular ones; the one a priſmatic columnar one, of ſix angles ſomewhat emulating the figure of cryſtal, the other an oblong quadrilateral column with two truncated ends: theſe ſeem the only regular figures of this gem; but beſides theſe it is every day found in numberleſs other miſ-ſhapen forms, often roundiſh, emulating the ſhape of pebbles, but full of ſmall flat planes or faces; frequently oblong, very often flat, and as often tapering, either from one end to the other, or elſe from the middle to both ends. A diamond bears the force of the ſtrongeſt fire, except the concentrated ſolar rays, without hurt, and even that infinitely fierceſt of all fires does it no injury, unleſs directed to its weaker parts.

It is a common thing for diamonds to be too thick or deep for the extent of their ſurface, and there is a certain proportion of depth, beyond which the gem ſhould not be allowed: in this caſe two diamonds are often made, by the regularly dividing one: this, when the maſs is of an angular figure, is done by cutting it through with a wire, wetted with oil, and covered with diamond-powder; but in the flat or more common maſſes, it is done much more expeditiouſly by finding the grain of the ſtone, and introducing the point of a fine flat chiſſel between them. This is not the only uſe of the ſpliting, for when a diamond has a flaw or blemiſh in it, which greatly debaſes its value, the plates may be ſeparated at a proper breadth, and the flaw removed; in which caſe the thinner cruſt, ſtruck off, is of value in proportion to its ſize, and the remainder, being now freed from its flaw, is of much more value than it was at firſt.

The

The places whence we have the diamonds are the East Indies, in the island of Borneo, and in the kingdoms of Visapour, Golconda, Bengal; and the Brasils in the West-Indies. They are not unfrequently found yellowish, blueish, and reddish, but more rarely greenish.

There have not been wanting people who have attributed to the diamond great virtues as a cordial; but we are apt to believe no body ever did, or will, try whether this has been said with any sort of foundation.

Valuation of DIAMONDS, among jewellers, is thus calculated: they suppose the value of a rough diamond to be 2 l. per carrat; then to find the value of those of greater weight, they multiply the square of their weight by 2, and this last product is the value of the diamonds in their rough state: thus, the value of a rough diamond weighing 4 carats, is equal $4\times4\times2=16\times2=32$ l. and so in other cases. Again, to find the value of wrought diamonds, they suppose half their weight lost in the manufacturing them, and therefore multiply the square of double their weight by 2; thus the value of a wrought diamond, weighing 3 carrats, is equal $6\times6\times2=36\times2=72$ l.

Cornish DIAMOND, in natural history, a name given to a kind of crystals, from their being found in Cornwall. See the article CRYSTAL.

Rough DIAMOND is the stone as nature produces it in the mines.

Rose-DIAMOND is that quite flat underneath, with its upper part cut in divers little faces, usually triangles, the uppermost of which terminate in a point.

Table-DIAMOND is that which has a large square face at top, encompassed with four lesser.

Brilliant DIAMOND, is that cut in faces both at top and bottom; and whose table or principal face at top, is flat.

DIAMOND, in the glass trade, an instrument used for squaring the large plates or pieces; and, among glaziers, for cutting their glass.

These sorts of diamonds are differently fitted up; that used for large pieces, as looking glasses, *&c.* is set in an iron ferril, about two inches long, and a quarter of an inch in diameter; the cavity of the ferril being filled up with lead, to keep the diamond firm: there is also a handle of box, or ebony, fitted to the ferril, for holding it by.

DIAMOND, in heraldry, a term used for expressing the black colour in the atchievements of peerage.

Guillim does not approve of blazoning the coats of peers by precious stones instead of metals and colours; but the english practice allows it. Morgan says the diamond is the emblem of fortitude.

DIAMOND-CUTTER. See LAPIDARY.

DIAMORUM, in pharmacy, a preparation of mulberries and honey, used against diseases of the throat, and for stopping dysenteries, *&c.*

DIANÆ ARBOR, or ARBOR LUNÆ, in chemistry, the beautiful crystallizations of silver, dissolved in aqua fortis, to which some quicksilver is added; and so called from their resembling the trunk, branches, leaves, *&c.* of a tree.

This elegant arrangement, however, of the particles of silver is not peculiar to this state or menstruum, since copper filings dropped into the solution of silver in aqua fortis, is found to have the same effect, when viewed by the microscope: nay, the silver-ores are frequently found ramified in the same manner.

DIANDRIA, in the linnæan system of botany, a class of plants comprehending all those with hermaphrodite flowers, and only two stamina in each; such are sage, olive, phillerea, jessamin, rosemary, *&c.*

DIANTHERA, in botany, a genus of the diandria-monogynia class of plants, whose corolla consists of a single ringent petal; the tube is patulous, of the length of the limb: the upper lip is of an ovated figure, the lower lip is divided into three oblong and equal segments.

DIANTHUS, in botany, a genus of the decandria-digynia class of plants, whose corolla consists of five petals, the ungues of which are of the length of the cup; they are narrow, and inserted into the receptacle; the limb is plane; and the bracteæ of the petals broadest at the extremity, and crenated; the fruit is a cylindric covered capsule, consisting of one cell, and opening four ways at the top; the seeds are numerous, compressed, and roundish. See plate LXXII. fig. 4. which represents the pink.

This genus comprehends the clove-jully-flowers or carnations, the pinks, and sweet-williams; all beautiful flowers, which may be propagated by seeds or layers.

DIAPASMA, in pharmacy, a name for all powders sprinkled on the body, whether as perfumes or otherwise. See the article CATAPLASM.

DIAPASON,

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DIAPASON, in muſic, a muſical interval, by which moſt authors, who have wrote on the theory of muſic, uſe to expreſs the octave of the Greeks. See OCTAVE. The diapaſon is the firſt and moſt perfect of the concords; if conſidered ſimply, it is but one harmonical interval; though, if conſidered diatonically, by tones and ſemitones, it contains ſeven degrees, *viz.* the three greater tones, two leſſer tones, and two greater ſemitones.

The interval of a diapaſon, that is the proportion of its grave ſounds to its acute is duplicate, *i. e.* as 2 : 1. See the article INTERVAL.

DIAPASON, among the muſical inſtrument makers, a kind of rule or ſcale, whereby they adjuſt the pipes of their organs, and cut the holes in their flutes, hautboys, *&c.* in due proportion, for performing the tones, ſemitones, and concords juſt.

A ſquare being divided into eight parallelograms, the points wherein a diagonal line interſects all theſe parallelograms, expreſs all the uſual intervals in muſic: and on this principle it is that the diapaſon is founded. There is a particular kind of diapaſon for trumpets, ſerving as a ſtandard of the different magnitudes they muſt have to perform the four parts of muſic. See the article TRUMPET.

There is another for ſackbuts, ſhewing how far they are to be lengthened and ſhortened, to raiſe or fall from one tone to another.

The bell-founders have likewiſe a diapaſon, ſerving to regulate the ſize, thickneſs, weight, *&c.* of their bells.

DIAPASON DIAEX, in muſic, a kind of compound concord, whereof there are two ſorts; the greater, which is in the proportion of 10 : 3; and the leſſer, in that of 16 : 5.

DIAPASON DIAPENTE, in muſic, a compound conſonance in a triple ratio, as 3 : 9. This interval, ſays Martianus Capella, conſiſts of nine tones and a ſemitone; nineteen ſemitones, and thirty-eight dieſes. It is a ſymphony made when the voice proceeds from the firſt to the twelfth ſound.

DIAPASON DIATESSARON, in muſic, a compound concord, founded on the proportion of 8 : 3. To this interval Martianus Capella allows eight tones and a ſemitone, ſeventeen ſemitones, and thirty-four dieſes.

This is when the voice proceeds from its firſt to its eleventh ſound. The moderns would rather call it the eleventh.

DIAPASON DITONE, in muſic, a compound concord, whoſe terms are as 10 : 4, or 5 : 2.

DIAPASON SEMIDITONE, in muſic, a compound concord, whoſe terms are in the proportion of 12 : 5.

DIAPEDESIS, in medicine, a tranſudation of the fluids through the ſides of the veſſels that contain them, occaſioned by the blood's becoming too much attenuated, or the pores becoming too patent.

DIAPENSIA, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of one ſaucer-like petal, the tube being cylindrical, and the limb divided into five obtuſe, and plane ſegments; the fruit is a trilocular roundiſh capſule, containing a great many roundiſh ſeeds.

DIAPENTE, in the antient muſic, an interval marking the ſecond of the concords; and, with the diateſſaron, an octave. See the article DIATESSARON.

This is what in the modern muſic is called a fifth. See the article FIFTH.

The diapente is a ſimple concord; yet, if conſidered diatonically, it contains four terms; two greater tones, a leſs tone, and a greater ſemitone. The diapente is the greateſt part of the octave harmonically divided. It is produced when the voice paſſes from its firſt to its fifth ſound.

DIAPENTE COL DITANO, in muſic, is, by Zarlin, and many others, uſed for what we call the ſeventh major. See the article SEVENTH.

DIAPENTE COL SEMIDITANO, in muſic, is the ſeventh minor. See the articles MINOR and MAJOR.

DIAPENTE, in pharmacy, is uſed for a medicine compounded of five ſeveral drugs or ingredients.

DIAPERED, or DIAPRE', in heraldry, the dividing of a field in planes, like fret-work, and filling the ſame with variety of figures. This chiefly obtains on bordures, which are diapered or fretted over, and the frets charged with things proper for bordures. Baron renders it *variatus*, which is not ſufficient to expreſs the ſeveral things of which it is variated.

DIAPHANOUS, an appellation given to all tranſparent bodies, or ſuch as tranſmit the rays of light; a quality which, according to the carteſians, is owing to the rectitude or ſtraightneſs of their pores; but, according to Sir Iſaac Newton, to the homogeneity of the ſubſtance of theſe bodies,

bodies, and of the medium which occupies their pores.

DIAPHOENICUM, in pharmacy, a fort of medicine or electuary chiefly made of dates. It purges ferofities, and excites the menfes. It is alfo ufed in dropfies, lethargies, apoplexies, and palfies.

DIAPHORESIS, διαφορησις, in medicine, an elimination of the humours in any part of the body through the pores of the fkin. See the article PERSPIRATION.

DIAPHORETICS, among phyficians, all medicines which promote perfpiration. See the articles ALEXIPHARMIC and SUDORIFIC.

Internal medicines for producing fweats were fo little in ufe among the antients, that Celfus has not a fingle word upon this fubject. If, therefore, fweats are of any advantage in fevers that arife from laffitude, or fome other fimilar caufe, fuch as thofe commonly called diary fevers, they feem to derive their efficacy from nature alone. But, from the times of the arabian phyficians, there has appeared fuch a multitude of fudorific medicines, that there is fcarce any fpecies of fever, againft which fome of the chemifts, or fome curious old woman, has not found out an antidote, without having any manner of regard to the nature of the difeafe. Hence that cuftom has been handed down, to our days, of treating feverifh patients with cordials, as promifing the moft grateful and agreeable cure. This method, as confifting too much in hot medicines, is juftly rejected by Sydenham, though it does not as yet feem to be fufficiently banifhed from modern practice; for, according to the confeffion of phyficians themfelves, thefe accelerate the motion of the blood: Hence the fever gradually increafing and feizing the brain, we obferve that the deliriums and diftentions of the nerves are fo far from being removed, that they are rather augmented. Others run into a different, though not a lefs fatal error, who, placing all their hopes of a cure in acids, forthwith have recourfe to vinegar or verjuice, as if it was expedient to kill a patient with cold, becaufe it was not proper he fhould be parched with heat. See the article FEVER.

DIAPHRAGM, in anatomy, a large, robuft, mufculous membrane or fkin, placed tranfverfely in the trunk, and dividing the thorax from the abdomen, whence the latin writers call it feptum tranfverfum.

Its fituation is not exactly even, but fomewhat oblique, fo that the anterior part is higher, the pofterior lower; its upper fuperficies convex, and its lower concave. It is connected with the fternum, the fpurious ribs, the pericardium, the mediaftinum, and the vertebræ of the loins. Its figure, taken tranfverfely, is fomewhat oblong and elliptic. There are in the diaphragm two large foramina; the firft is in the left fide of it, and gives paffage to the gula, and the par vagum; the fecond is in the right fide of it, and the lower trunk of the vena cava paffes thro' it: there is alfo an interftice between the two heads of the lower part, through which pafs the aorta, the vena azygos, and the ductus thoracicus. The diaphragm is covered with a membrane on the upper part from the pleura; on the lower, from the peritonæum. Its fubftance is mufcular; the upper part, which is large and elliptic, arifes from the fpurious ribs, the tranfverfe mufcles of the abdomen, and the cartilago xiphoides; and, with its tendon, renders the nervous center of the diaphragm almoft triangular: the lower arifes from a double bafe, from the vertebræ of the loins on each fide, and is inferted nearly into the center of the fuperior.

The ufes of the diaphragm are, firft, to affift in refpiration; for, in taking in the breath, it is preffed downwards, and, in expiration, it rifes upward into the cavity of the thorax: fecondly, to affift the neceffary motions of the contents of the abdomen, *viz.* of the ftomach, inteftines, liver, and fpleen; and in the promoting the fecretions of the chyle, bile, &c. And, laftly, for affifting the expulfion of the fæces, the urine, the fœtus in parturition, and of the fecundines.

DIAPORESIS, in rhetoric, a figure of oratory, expreffing the uncertainty of the fpeaker how he fhall proceed in his difcourfe: fuch is that beautiful line of Homer,

Τι πρωτον, τι δ' επειτα, τι δ'υςατιον καταλεξω;

DIAPRE', DIAPERED, in heraldry. See the article DIAPERED.

DIAPRUNUM, in pharmacy, the name of two compofitions directed thus in the London difpenfatory.

The diaprunum lenitivum. Take of new and ripe damafk prunes, one hundred; boil them in a fufficient quantity of water, till they are foft: then remove them from the fire, and when cold, drive the pulp through a fieve, and fet by for ufe. In the

the liquor ſtrained from the prunes, before pulping, boil one ounce of violet flowers, and after ſtraining again, diſſolve it in two pounds of ſugar, and boil into a ſyrup; to which add of the beforementioned pulp half a pound; of caſſia and tamarinds, diſſolved in a little of the ſame decoction and pulped, of each one ounce; boil them again over a gentle heat, and frequently ſtir the mixture; after which ſift in the following powders, of coriander-ſeed, rhubarb, liquorice, and marſh-mallows roots, of each a ſufficient quantity to make into a ſoft electuary.

The diaprunum ſolutivum. Take of the lenitive compoſition of prunes, four pounds; of prepared ſcammony, two ounces five drams, and mix them together into an electuary.

DIARBEC, or DIARBECK, the capital of a province of the ſame name, anſwering to the antient Meſopotamia: it is ſituated on the river Tigris, near its ſource, in 42° eaſt long. and 37° 30′ north lat.

DIARRHODON, in pharmacy, a name given to divers compoſitions in which roſes are the principal ingredient. In the old college diſpenſatory, one of theſe is directed diarrhodon abbatis; but it is omitted in the laſt. There are alſo the trochiſci diarrhodon, compoſed of red roſes, ſhavings of ivory, the ſaunders, liquorice, maſtic, ſaffron, camphor, and roſe-water: they are good to fortify the heart, ſtomach, and liver, and to ſtop dyſenteries, and other fluxes of the belly.

Pilulæ diarrhodon are compoſed of aloes, trochiſci diarrhodon, wormwood leaves, maſtic, and rock-ſalt. They are ſaid to purge, fortify the ſtomach, promote digeſtion, and prevent a ſtinking breath. Neither are theſe two much uſed at preſent.

DIARRHOEA, or LOOSENESS, in medicine, is a frequent and copious evacuation of liquid excrement, by ſtool; and may proceed from aliments or humours of various kinds, derived from different parts into the inteſtines.

The cauſe is a ſtimulus, which irritates the viſcera, occaſioning the expulſion of their fluids; and may, therefore, proceed from the veſſels of the liver, pancreas, meſentery, and inteſtines; whence at the ſame time, the mouths of the meſenteric veins, and of the lacteals, are obſtructed: or there may be an extraordinary laxity of the inteſtinal fibres: or, laſtly, it may ariſe from a ſtoppage of other excretions.

It is frequently attended with gripings; the patient is weak, makes but little urine, has a depreſſed pulſe, a depraved appetite, and is ſometimes feveriſh. In a diarrhœa ariſing from ſharp, fermenting juices in the primæ viæ, which accelerate the periſtaltic motion of the inteſtines, the firſt indication is to diſcharge the ſtimulating matter, which may be perfected by a doſe or two of rhubarb in the morning; at night the patient may take fifteen drops of the thebaic tincture, in two or three ſpoonfuls of ſimple cinnamon water: the rhubarb is to be repeated till the looſeneſs abates, which is generally after the ſecond doſe.

If there is a ſaburra of ill-concocted matter in the ſtomach, a vomit will be neceſſary, of ipecacuanha, or two ounces of its tincture. If the diarrhœa continues to be violent, it will be proper to mix aſtringents with the rhubarb. If it proceeds from a ſuppreſſed perſpiration, and if the ſtools are thin, and the patient feveriſh, firſt bleed, and then give emetics with a gentle purge. A bilious diarrhœa ought not to be too ſuddenly ſtopped, but the humours are to be corrected gradually: for which purpoſe a ſcruple of rhubarb ſlightly toaſted, with a few grains of nitre, is very uſeful. Likewiſe half a dram of the expreſſed oil of nutmeg, either alone, or mixed with a grain of opium, and given in broth, is very efficacious. The humours are likewiſe corrected with thin emulſions of almonds and white poppy ſeeds, with the addition of diacodium. When a diarrhœa is very obſtinate, after toaſted rhubarb has been given for ſome days, a ſweat ſhould be promoted, with a dram of new venice treacle, and twelve grains of burnt hartſhorn, calx of antimony and purified nitre. The patient's common drink may be decoct. alb. with ſolution of gum arabic; rice boiled in water, with a little cinnamon; or a decoction of the cort. granat. theſe may be made palatable with ſyrup of orange-peel. Clyſters are likewiſe often ſerviceable.

An obſtinate diarrhœa, according to Etmuller, is to be cured by a courſe of vomits of ipecacuanha. An habitual diarrhœa is greatly relieved by wearing a flannel ſhirt, and keeping the body warm, according to Wainwright.

The diarrhœa of children is not to be ſtopped, either with aſtringents, or narcotics: for the aſtringents turn the flux of ſharp humours towards the noble parts, and endanger

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danger the life of the child. And though narcotics appeafe the feverity of the turgefcent humours for a time, yet they afterwards break out with greater force. Befides, opiates are too powerful for the tender conftitution of infants, and muft not be given at all, or with the utmoft caution. In flight cafes, diafcordium may be ventured on, to five or fix grains: but if there is a fever, it cannot be given without danger.

Therefore, the beft way is to give chalk, coral, pearls, and the like, of which about half a fcruple is a dofe: after which the cure may be completed with rhubarb, from fix grains to half a fcruple in folutive fyrup of rofes.

In dangerous cafes, a few grains of the eleuther bark may be added, or a dram of the extracts of peruvian bark may be diffolved in half an ounce of mint, or cinnamon water, and given from one to nine drops, every three or four hours. Externally the abdomen may be anointed with expreffed oil of nutmegs, impregnated with carminative and ftomachic oils. The nurfe fhould fhun the cold air, abftain from drinking too much, and ufe a temperate diet.

DIARTHROSIS, in anatomy, a kind of articulation, or juncture of the bones, in which there is a manifeft motion. See the article ARTICULATION.

The diarthrofis comprehends, 1. The enarthrofis, in which the head of one of the bones is received into a deep cavity in the other, as in the articulation of the femur. 2. The arthrodia, in which the head of one of the bones is received into a flighter cavity in the other, as in the juncture of the os humeri with the fcapula. 3. The ginglymus, in which the bones mutually receive, and are received by one another, as is the cafe in the articulation of the humerus and cubitus. To thefe, Fallopius adds the trochoides, in which the motion is like that of a wheel about its axis, as is the cafe of the articulation of the firft vertebra of the neck with the fecond: and to all thefe fome of the modern anatomifts have added alfo the amphiorthrofis, a term which comprehends all thofe junctures of the bones which have a manifeft motion, and which differ from the feveral articulations now defcribed, either in regard of their figure, or the motion they allow of. See the articles ENARTHROSIS, ARTHRODIA, GINGLYMUS, *&c.*

DIARY, among traders, denotes a day-book containing the proceedings of one day. See the article BOOK.

DIARY FEVER, the fame with an ephemera. See the article EPHEMERA.

DIASCHISM, διασχισμα, among muficians, denotes the difference between the comma and enharmonic diefis, commonly called the leffer comma. See the articles COMMA and DIESIS.

DIASCORDIUM, in pharmacy, a celebrated compofition fo called from fcordium, one of its ingredients. It is otherwife termed *confectio fracaftorii*, and is thus directed by the college.

Take of cinnamon and caffia-wood, of each half an ounce; of true fcordium, one ounce; of cretan dittany, tormentil, biftort, galbanum, and gum arabic, of each half an ounce; of ftorax, four drams and an half; of opium, and feeds of forrel, of each one dram and an half; of gentian, half an ounce; of american bole, one ounce and an half; of lemnian fealed earth, half an ounce; of long pepper and ginger, of each two drams; of clarified honey, two pounds and a half; of fugar of rofes, one pound; of generous canary, eight ounces; make into an electuary. See the article ELECTUARY. It is excellent in all kinds of fluxes, and a great ftrengthener both of the ftomach and bowels. Nurfes frequently give children this medicine to make them fleep; but the practice is very detrimental, and generally the caufe of many diforders, as it keeps them too coftive. It is alfo ufed againft the plague, and to prevent putrefaction.

DIASEBESTEN, in pharmacy, a foft purgative electuary, whereof febeftens are the principal ingredients. The other ingredients are prunes, tamarinds, juices of iris, anguria and mercurialis, penidies, fimple diaprunum, violet feeds, and diagrydium. It is good in remitting and continued fevers, *&c.*

DIASENNA, in pharmacy, the name of a medicine in which fenna is the principal ingredient.

The other ingredients are fugar-candy, cinnamon, lapis lazuli, filk, cloves, galanga-minor, black peper, nardus indica, feed of bafilicum, flowers of cloves, cardamoms, faffron, ginger, zedoary, *&c.* This electuary is taken againft melancholy and fpleen, and againft difeafes arifing from an atrabilis.

DIASIA, in grecian antiquity, a feftival kept at Athens in honour of Jupiter the propitious.

DIASTASIS, a term uſed by antient phyſicians for a diſtention of the muſcles, or ſeparation of the bones.

DIASTEM, διαςημα, among antient muſicians, the ſame with what the moderns call interval. See INTERVAL.

Muſicians divide intervals into two kinds; one of them is called ſyſtem, which is to contain, at leaſt, two intervals in the diatonic kind of muſic; but in the enharmonic, it contains more; the other, which they call diaſtem, is a mere ſimple interval.

DIASTOLE, διαςολη, among phyſicians, ſignifies the dilatation of the heart, auricles, and arteries; and ſtands oppoſed to the ſyſtole, or contraction of the ſame parts. See SYSTOLE and HEART.

Many are the opinions of authors concerning the cauſe of the diaſtole of the heart; but the moſt probable one ſeems to be that of Dr. Drake, who attributes it to the operation of the air in the lungs; which, expanding the pulmonary arteries and veins, acts like the drawing of the embolus of a pump; and as this enlargement, which is very conſiderable, makes way for the blood to circulate, ſo the contraction of the heart acts like the preſſure of the atmoſphere upon the ſurface of water, compelling it to flow where the reſiſtance is leaſt. See CIRCULATION.

Thus a paſſage is opened for the blood to paſs from the right ventricle to the left, through the lungs; and at the ſame time, by emptying the right ventricle, facilitates the ſyſtole, whereby the blood is protruded from the left ventricle.

DIASTOLE, in grammar, a figure of proſody, whereby a ſyllable naturally ſhort is made long: ſuch is the firſt ſyllable of Priamides, in the following verſe of Virgil.

Atque hic Priamides: nihil ô tibi, amice, relictum.

This figure is uſed either out of mere poetic licence, without any neceſſity for ſo doing, or through neceſſity, for the ſake of the verſe; as when three or more ſhort ſyllables follow each other in hexameter verſe.

DIASTYLE, in the antient architecture, an edifice, where the columns ſtand at ſuch a diſtance one from another, that eight modules, or four diameters, are allowed for the intercolumniation.

DIASYRMUS, διασυρμος, in rhetoric, a kind of hyperbole, being an exaggeration of ſome low, ridiculous thing.

DIATESSARON, διατεσσαρον, among antient muſicians, a concord, or harmonical interval, compoſed of a greater tone, a leſs tone, and one greater ſemi-tone: its proportion in numbers is as 4 : 3. See the article CONCORD.

DIATESSARON, in pharmacy, the name of a compoſition ſo called, from the four ingredients it comprehends: it is prepared thus.

Take of gentian root, bay-berries, myrrh, and roots of birthwort, of each two ounces; of honey, two pounds; mix them into an electuary. This, with the addition of the ſhavings of ivory, two ounces, is entitled diapente, or a compoſition of five ingredients.

This medicine was at firſt entered in the college diſpenſatories under the name of theriaca. Quincy recommends it as a medicine of great importance in the diſeaſes of cattle. It is alſo uſed againſt the ſting of venomous beaſts, epilepſies, convulſions, &c.

DIATONIC, an epithet given to muſic, as it proceeds by tones and ſemi-tones, both aſcending and deſcending. See the articles MUSIC and GENUS.

The greek authors divide the genera or kinds of muſic into diatonic, chromatic, and enharmonic. See the articles CHROMATIC and ENHARMONIC.

Diatonic muſic, according to Nicomachus and others, allows of three degrees, the greater tone, leſs tone, and ſemi-tone. See the article TONE.

Hence diatonic muſic appears the moſt natural, and of conſequence the moſt antient. In the diatonic muſic, there is a tone between every two notes in the ſcale, except *mi*, *fa*, and, as the French term it, *ſi* and *ut*, where there is only a greater ſemi-tone. The diatonic genus was by the antients divided into two ſpecies, the *molle* and the *intenſum*. The laſt is in daily practice. It is commonly ſaid to conſiſt of two tones and a ſemi-tone; but to ſpeak exactly, it conſiſts of a ſemi-tone major, a tone minor, and a tone major.

DIATONICO-DIATONICO, according to Zarlin, is the pure and natural diatonic genus, or when the progreſs of the notes is B quarré or B natural, in which not one of the ſounds is the leaſt altered. Such is the plain chant of the church.

DIATRAGACANTH, in pharmacy, a name applied to certain powders, whereof gum tragacanth is the principal ingredient; of which there are two kinds, the cold and the hot: the cold is directed thus: take of gum tragacanth, two

6 B 2 ounces;

ounces; of gum arabic, an ounce and two drams; of ſtarch, half an ounce; of liquorice, and the ſeeds of melons and white poppies, of each two drams; of ſugar-candy, three ounces: mix them into a powder. This is frequently preſcribed in hectical heats, in choleric conſtitutions, in diſtempers of the breaſt, in ſtranguries, heat of urine, and the pungency of venereal gleets.

Powder of hot diatragacanth is compoſed of gum tragacanth, cinnamon, hyſſop, almonds, linſeed, fenugreek, liquorice, and ginger. It is good againſt aſthmas, to promote expectoration, ſtrengthen the ſtomach, and aſſiſt digeſtion.

DIAUGOPHRAGMIA, in natural hiſtory, a genus of foſſils of the order of ſeptariæ, whoſe partitions, or ſepta, conſiſt of ſpar with an admixture of cryſtal. Of this genus there are three ſpecies. 1. A red kind, with browniſh-yellow partitions. 2. A browniſh-yellow kind, with whitiſh partitions. 3. A bluiſh-white kind, with ſtraw-coloured partitions.

DIAULODROMI, διαυλοδρομοι, in antiquity, an appellation given to ſuch racers as paſſing round the meta, or goal, returned to the carcer, or place of ſtarting, before the race was finiſhed.

DIAZEUCTIC, or DIEZEUCTIC TONE, in the antient greek muſic, a tone which disjoined two fourths, one of each ſide of it; and which, being joined to either, made a fifth: this, in their muſic, was from *meſe* to *parmeſe*; that is, from our A to B: ſuppoſing *mi* to ſtand in B *ſub mi*, they allowed to their diezeuctic tone, which is our *la mi*, the proportion of 9 : 8, as being the unalterable difference of the diapente and the diateſſaron. See the article DIAPENTE, *&c.*

DIBBLE, among gardeners, the name of the tool, or forked ſtick, wherewith they ſet plants.

DICE, among gameſters, certain cubical pieces of bone or ivory, marked with dots on each of their faces, from one to ſix, according to the number of faces.

Sharpers have ſeveral ways of falſifying dice. 1. By ſticking a hog's briſtle in them, ſo as to make them run high or low, as they pleaſe. 2. By drilling and loading them with quickſilver; which cheat is found out by holding them gently by two diagonal corners; for if falſe, the heavy ſides will turn always down. 3. By filing and rounding them. But all theſe ways fall far ſhort of the art of the dice-makers; ſome of whom are ſo dextrous this way, that your ſharping gameſters will give any money for them.

Dice formerly paid 5 s. every pair imported, with an additional duty of 4s. $9\frac{45}{100}$d. for every 20 s. value upon oath; but are now prohibited to be imported.

DICHOTOMY, a term uſed by aſtronomers for that phaſis, or appearance of the moon, wherein ſhe is biſſected, or ſhews juſt half her diſk. In this ſituation the moon is ſaid to be in a quadrate aſpect, or to be in her quadrature.

DICHOTOMY, in botany, a term uſed to expreſs that diviſion of the branches which we ſee in the miſletoe, and in the greater part of the ſea fucus's, in which each branch is divided into two.

DICKER, *dicra*, in old writers, denotes the quantity of ten hides of ſkins, whereof twenty made a laſt: alſo ten pair of gloves, ten bars of iron, and the like, are ſometimes expreſſed by the term dicker.

DICROTUS, among antient phyſicians, a rebounding pulſe, or one which beats double. See the article PULSE.

This is ſaid to be an infallible ſign of an approaching hæmorrhage; which may be expected in twenty-four hours, if the dicrotus happens at every ſecond or third pulſation; in two days, if at every eight; in three days, if at every ſixteenth; and in four days, if only at every thirtieth, or thirty-ſecond pulſation.

DICTAMNUS, DITTANY, in botany, a genus of the decandria-monogynia claſs of plants, the corolla of which conſiſts of five ovato-lanceolated, accuminated, unguiculated, and unequal petals; three of which are turned upwards, and two are placed obliquely at the ſides: the fruit is compoſed of five capſules, growing together by their inſides; they are compreſſed, accuminated, diſtant at the top, and formed of two valves: the ſeeds are numerous, and turbinated. See plate LXXII, fig. 5.

The antients have recorded almoſt miracles of the virtues of this plant in the cure of wounds, and in the prevention of miſchief from venomous bites: they tell us, that even the beaſts were informed of its virtues on theſe occaſions, and had recourſe to it when hurt: they gave it alſo to promote the menſes, and to aſſiſt delivery, in the expelling of the fecundines, and in malignant fevers: with us it is wholly out of uſe, except as an ingredient in ſome of the officinal compoſitions.

The white dittany-root, which we call fraxinella in the shops, is accounted cardiac, uterine, and alexipharmic.

DICTATE, *dictamen*, among schoolmen, a motion, or suggestion of a man's conscience, contrary to which if any action is performed, it is properly termed a bad one, even if the consequences should prove otherwise. See CONSCIENCE.

DICTATE, *dictata*, is also used in the schools for the lecture of a master, which the scholars take down in writing: whence this act of the master is termed dictating.

DICTATOR, in the policy of the antient Romans, a magistrate invested with sovereign and even arbitrary power.

He had power of life and death; also to raise or disband troops, make war or peace, and that without the consent either of the senate or people, or being accountable for his proceedings. He was elected by one of the consuls in the night-time on the frontiers of the common-wealth, and no where else; and the ordinary duration of his office was only for six months, during which time all other magistracies ceased, the tribuneship excepted. Whenever he appeared in public, he was attended by twenty-four lictors, or double the number allowed a consul. However, notwithstanding all this power, he could not go out of Italy, or even ride on horseback during a march, without leave from the people.

This office was accounted the safeguard of the commonwealth for four hundred years together, till Sylla and Cæsar, by assuming the title of perpetual dictators, converted it into tyranny, and rendered the very name odious.

DICTION, the phrase, elocution, or stile of a writer, or speaker.

It is required that the diction, or language, of an orator, should be pure, proper to the subject, rich without affectation, strong and close without driness, and suitable to the person, time, place, and audience. In tragedy, the diction is accounted the fourth essential part; and though it is of the least importance of any of the other essentials, yet special care must be taken that every passion speak in its peculiar diction. It is observed, that the diction of the Italians abounds too much with shrewd words, querks, and quibbles; and even the French are charged with the like fault in their diction. Some authors are, again, thought so preposterously fond of jocose and facetious repartees, and ludicrous sentences, that they have indulged this affectation to a fault; whence arose that sort of diction commonly called burlesque, of which the French have afforded us a specimen in the works of the celebrated Scarron.

DICTIONARY, a collection, or catalogue, of all the words of a language, art, science, &c. with their explanations, ranged in alphabetical order.

The most antient dictionaries for the latin tongue, are that called Papias, compiled by Solomon, abbot of St. Gall, and bishop of Constance, who lived about the year 1409; another compiled in 1496, called Gemma Vocabulorum; a third, called Promptorium Parvulorum, sive Clericorum, printed in folio, at London, in the year 1499, by Richard Pynson: this work consisted only of one part, which exhibited the english words before the latin, being destitute both of the latin and historical parts: but these defects were supplied by a dictionary which was printed at London in quarto in the year 1516, by Wynkyn de Worde, entitled, Ortus Vocabulorum alphabetico ordine fere omnia quæ in Catholico, Breviloquio, Cornucopia, Gemma Vocabulorum, atque medulla grammaticæ ponuntur, cum vernaculæ linguæ Anglicanæ expositione, continens. The most celebrated old latin dictionary, is that of Ambrose Calepine, a hermit of St. Augustine, at Bergamo, and son of the count Calepin. The most noted old dictionaries in english and latin are those of Cooper, Holyoake, and Gouldman: among the modern ones, Littleton, Cole, &c. but that of Ainsworth merits most consideration, as being agreeable to its title, Thesaurus linguæ Latinæ compendiarius. The last editions of this book have been greatly improved by Samuel Patrick, L. L. D.

For the Greek, the most noted dictionaries are those of Stephens, Scapula, Schrivelius, Hedericus, &c. For the English there are several dictionaries, but that of the most authority is Johnson's. The most celebrated historical dictionary is that of Mr. Bayle, in two volumes folio, entitled, an historical and critical dictionary. The philosophical dictionary of greatest note, is that of Chauvinus; for commerce, that of Savary; for law, those of Calvinus and Jacob; and among the dictionaries of arts and sciences, may be reckoned those of Harris and Chambers.

In the French, the most worthy of notice among works of this nature are the dictionary

tionary of Trevoux, and the Encyclopedie.

A performance of this kind being a digeſt of the body of learning, or, rather, of general knowledge, is thought capable of being made univerſally uſeful and inſtructive; and as the objects of our knowledge grow daily more numerous, and improvements in arts and ſciences are continually made, a work of this kind is continually capable of new improvements. It is farther advanced, that, beſides preventing, in ſome meaſure, the neceſſity and expence of a multitude of books, which too frequently retard rather than promote, and bewilder rather than guide in the purſuit of knowledge, there is no form or method of writing ſo advantageouſly diſpoſed to propagate knowledge through the body of a people, or that can be made to comprehend ſo great a part of the circle of learning, and ſo well anſwer the purpoſes of a library, as a dictionary of this nature. The writers of a dictionary of arts and ſciences, are exempted from the obſervation of certain laws concerning property; never pretending to build upon their own foundation, or treat at their own expence, being privileged to raiſe contributions for the public ſervice wherever they can. In effect, their quality as dictionariſts, or collectors, give them a title to every thing that may ſuit their purpoſe, without rendering them liable to the imputation of plagiariſm. See more relating to the nature, character, and office of a dictionary, in the *introduction.*

DICTUM, in our old writers, ſignifies an arbitrament or award; and hence the term dictores is uſed for arbitrators.

DICTUM DE KENELWORTH, was an award between king Henry III. and his barons and others who had been in arms againſt him, wherein was contained a compoſition of thoſe that had forfeited their eſtates in the rebellion. It was ſo called, on account of its being made at Kenelworth caſtle in Warwickſhire.

DIDACTIC, or DIDACTICAL, in the ſchools, ſignifies the manner of ſpeaking, or writing, adapted to teach or explain the nature of things.

DIDAPPER, in ornithology, the ſame with the dob-chick, a ſpecies of colymbus.

DIDELPHIS, in zoology, a genus of quadrupeds, of the order of the glires, the characters of which are theſe: there are two obtuſe and four conical fore-teeth, in the upper jaw; thoſe of the lower jaw are eight, and very ſmall; and the dog-teeth, in each jaw, are three in number. To this genus belong the opoſſum, and african rat.

DIDYNAMIA, διδυναμια, in the linnæan ſyſtem of botany, a very comprehenſive claſs of plants, the fourteenth in order; the eſſential characteriſtic of which is, that there are four ſubulated ſtamina, inſerted into the tube of the flower, two whereof are ſhorter than the others, and placed together; the antheræ being commonly hid under the upper lip of the flower, and connivent in pairs. It has its name from the two longer ſtamina being ſuppoſed more efficacious in fecundating the ſeeds, than the reſt; and as the genera belonging to it are very numerous, they have been divided into two ſeries or orders, under the names of gymnoſpermia and angioſpermia; the latter having, and the former wanting a pericarpium, or ſeed-veſſel. See the article BOTANY.

To this genus belong baum, germander, lavender, thyme, betony, mint, baſil, fox glove, bear's-breech, &c.

DIE, in architecture, the ſame with dye. See the article DYE.

DIE, in geography, a town of France, in the province of Dauphiny, ſituated on the river Drome, twenty-two miles ſouth of Grenoble: eaſt long. 5° 20′, north lat. 44° 50′.

DIEGEM, a town of the auſtrian Netherlands, in the province of Brabant, about three miles north of Bruſſels: eaſt long. 4° 20′, and north lat. 51°.

DIEM CLAUSET EXTREMUM, a writ that formerly iſſued out of the chancery to the eſcheator of the county, upon the death of any of the king's tenants in capite, to inquire by a jury of what lands he died ſeiſed, of what value, and who was the next heir to him: and on the heir's coming of age, he was to ſue livery of his land out of the king's hands.

DIEPE, a port-town of France, ſituated on the britiſh channel, about thirty miles north of Rouen, and oppoſite to the port of Rye in England: eaſt long. 1° 15′, and north lat. 49° 55′.

DIEPHOLT, a city of Weſtphalia, in Germany, ſituated at the north end of the Dummer-lake, thirty-five miles ſouth of Bremen: eaſt long. 8°, north lat. 53°. It is ſubject to the king of Great Britain, as elector of Hanover.

DIER, or DYER. See the article DYER.

DIERVILLA, in botany, a genus of the pentandria-monogynia claſs of plants; the flower

flower of which is monopetalous, with an almost bilabiated limb, whereof the upper lip is again divided into two, and the under one into three segments: the fruit is an oval capsule surrounded by the cup, with only one cell, wherein are contained a great many very small oval seeds.

DIES, DAY, in chronology. See DAY.

DIES, in common law, are of two kinds, dies juridici, and non juridici.

DIES JURIDICI, or FASTI, are all days wherein justice is administred in court.

DIES NON JURIDICI, or NEFASTI, are all Sundays in the year, and, in easter term, the feast of ascension of our Lord; in trinity term, the nativity of St. John the baptist; in michaelmas term, the feast of all saints and all souls; and in hilary term, the purification of the blessed virgin.

DIES DATUS, is a day, or time of respite, given by the court to the defendant in a cause.

DIES MARCHIÆ, was the day of congress, or meeting of the English and Scotch, annually appointed to be held on the marches, or borders, in order to adjust all differences between them.

DIESIS, in music, is the division of a tone less than a semi-tone; or, an interval consisting of a less or imperfect semi-tone.

Diesis is the smallest and softest change or inflexion of the voice imaginable; it is called a feint, expressed thus X, by a St. Andrew's cross, or saltier. Aristotle calls dieses the elements of the voice, as letters are those of discourse. It appears, however, that Aristotle's dieses were different from ours; and we find Vitruvius, and all the greek authors, expresly make the diesis a quarter of a tone: but the Pythagoreans, who are held inventors of the name diesis, did not make it so small: they only divided the tone into two unequal parts; and they called the lesser diesis, which we call a lesser semi-tone; and the greater, which we call the greater semi-tone, they called apotome. See the article APOTOME.

But in aftertimes, when the tone came to be divided into three or four parts, the name diesis was retained to them all.

The harmonical diesis is the difference between a greater and a less semi-tone.

Dieses are divided into three kinds; the lesser enharmonical diesis, or simple diesis, marked by a single cross, which raises the note following two commas, or about a quarter of a tone, and is the least interval that is sung; and never more than two are found together in whatever genus; nor are those two of the same kind.

The chromatic or double diesis, denoted by a double cross, raises the note following by a lesser semi-tone, or four commas, which is the common diesis. The greater enharmonical diesis, denoted by a triple cross, raises the following note six or seven commas, or about three quarters of a tone.

DIEST, a town of the austrian Netherlands, in the province of Brabant, situated on the river Demer, fifteen miles north-east of Louvain: east long. 5°, and north lat. 51° 5′.

DIET, *diæta*, διαιτα, in medicine, according to some, comprehends the whole regimen, or rule of life, with regard to the six non-naturals, air, meats and drinks, sleep and watching, motion and rest, passions of the mind, retentions and excretions. See the article REGIMEN, &c.

The more accurate writers, however, restrain the term diet to what regards eating and drinking, or solid aliments and drinks. See FOOD and DRINK.

The principal and most general aliment is bread, whereof the crust is esteemed most easy of digestion, the crum being more oily and heavy. Pulse of all kinds nourish much, but are heavy, windy, and viscous, and, consequently, are apt to cause obstructions. Rice, barley, and oats, properly prepared, are nourishing, emollient, and restorative. Nuts, almonds, and chesnuts are full of a nourishing oil, but are hard of digestion. Fruits, which are pulpy and tart, abound with water, and are refreshing, moistening, and sedative, appeasing the too rapid motions of the blood, quenching thirst, and digesting easily: such are strawberries, gooseberries, currants, apricots, peaches, pears, and apples. These should be eaten ripe, and in a small quantity at once; and the best way of all is to eat them boiled or baked, as being windy. Pot-herbs are less nourishing than the farinaceous or mealy substances. Lettuce, succory, sorrel, purslain, are cooling and refreshing; artichoaks, cellery, cresses, asparagus, and parsley, are a little heating; and truffles, champignons, garlic, shallots, pepper, cloves, nutmegs, mustard, &c. heat very much.

Of animal substances used in diet, the flesh of young animals is preferred to that of old ones: and the flesh of wild animals is said to be lighter, and more easily digested, than that of tame.

Liquid aliments are milk, eggs, chocolate, ſoups, and broths. Milk is good for weak perſons, whoſe ſtomach is languid, and for children; new laid eggs yield very good nouriſhment, are eaſy of digeſtion, and agree with old people, and thoſe of an exhauſted body. Chocolate is a very agreeable and nouriſhing liquor: it ſtrengthens the ſtomach, reſtores the body, helps the digeſtion, and ſoftens ſharp humours; and conſequently is very proper for perſons of a weak ſtomach. See EGG, CHOCOLATE, *&c.*

As to drinks, wine, taken too freely, is prejudicial; but, taken with moderation, it ſtrengthens the ſtomach, and aſſiſts digeſtion. That malt liquor is accounted beſt, which is ſpecifically lighteſt, and not ſaturated with too groſs a ſubſtance, as paſſing more freely through the emunctories of the body, and eſpecially by urine: for as to all thick, muddy, heavy, and ſtale-beer, not ſufficiently boiled, it offends the head, generates wind, obſtructions, the ſtrangury, aſthma, and colic. See WINE, BEER, CYDER, *&c.*

Tea promotes perſpiration, ſtrengthens and clears the ſtomach, and helps digeſtion. Coffee, taken after dinner, helps digeſtion, and allays the fumes of wine. Moderately taken, it thins the blood and humours; but its exceſs agitates the blood, cauſes watching, and occaſions hæmorrhages.

From this view of the materials of diet, it appears, that the beſt way to preſerve health, is to live upon plain ſimple foods, lightly ſeaſoned, and in a quantity agreeable to the age, ſtrength of the ſtomach, ſex, conſtitution, and chiefly to what nature has by experience been found to require. Hunger ſhews the beſt time of eating, as thirſt does of drinking. Perſons who find no inconvenience from dining and ſupping every day, need not change their manner of life; and, in youth, ſomething taken between meals is not amiſs. When a perſon is much fatigued, and his ſpirits diſſipated, it is proper to reſt before eating; and, in caſes of diſtreſs and ſorrow, the food ſhould be very light, and ſmall in quantity. In ſummer, when the ſpirits and fluid parts are apt to evaporate, the diet ſhould be moiſt, cooling, and eaſy of digeſtion, to repair the loſs with the greater ſpeed; whereas, in winter, the ſtomach will admit of more ſolid and heating aliments. See the articles FLESH, FRUIT, BUTTER, MILK, *&c.*

DIET-DRINKS, a form in phyſic, including all the medicated wines, ales, and wheys, uſed in chronic caſes. They require a courſe or continuation to anſwer any intention of moment. In all acute caſes they are of no uſe, but where the diſorder of a conſtitution is gradually to be gained upon, much help may be had from this quarter.

DIET, or DYET, in matters of policy, is uſed for the general aſſembly of the ſtates, or circles of the empire of Germany, and of Poland, to deliberate and concert meaſures proper to be taken for the good of the public.

The general diet of the empire is uſually held at Ratiſbon: it conſiſts of the emperor, the nine electors, and the eccleſiaſtical princes; *viz.* the archbiſhops, biſhops, abbots, and abbeſſes; the ſecular princes, who are dukes, marqueſſes, counts, viſcounts, or barons; and the repreſentatives of the imperial cities. It meets on the emperor's ſummons, and any of the princes may ſend their deputies thither in their ſtead. The diet makes laws, raiſes taxes, determines differences between the ſeveral princes and ſtates, and can relieve the ſubjects from the oppreſſions of their ſovereigns.

The diet of Poland, or the aſſembly of the ſtates, conſiſts of the ſenate and deputies, or repreſentatives of every palatinate or county and city, and meet uſually every two years, and oftener, upon extraordinary occaſions, if ſummoned by the king, or, in his abſence, by the archbiſhop of Gneſna. The general diet of Poland ſits but ſix weeks, and often breaks up in a tumult much ſooner: for one diſſenting voice prevents their paſſing any laws, or coming to any reſolutions on what is propoſed to them from the throne.

Switzerland has alſo a general diet, which is uſually held every year at Baden, and repreſents the whole helvetic body: it ſeldom laſts longer than a month. Beſides this general diet, there are diets of the proteſtant cantons, and diets of the catholic ones; the firſt aſſemble at Araw, and are convoked by the canton of Zurich; the ſecond at Lucern, convoked by the canton of that name.

DIETS, a town in the circle of the upper Rhine, in Germany, ſituated on the river Lohn, twenty miles north of Mentz, and ſubject to the houſe of Naſſau-Orange: eaſt long. 7° 40′, and north lat. 50° 28′.

DIEU ET MON DROIT, i. e. *God and my right*, the motto of the royal arms of England,

England, first assumed by king Richard I. to intimate that he did not hold his empire in vassalage of any mortal.

It was afterwards taken up by Edward the third, and was continued without interruption to the time of the late king William, who used the motto *je maintiendray*, though the former was still retained upon the great seal. After him queen Anne used the motto *semper eadem*, which had been before used by queen Elizabeth; but ever since queen Anne, *dieu et mon droit* continues to be the royal motto. See the article MOTTO.

DIEU SON ACT, words antiently often used in our law; and to this day, it is a maxim in law, that the act of God shall prejudice no man: therefore, if a house is blown or beaten down by a tempest, thunder or lightning, the lessee, or tenant for life, or years, shall be quit of an action of waste; and by the law he has likewise a special interest or liberty allowed to take timber, to rebuild the house for his habitation.

DIEXAHEDRIA, in natural history, a genus of pellucid and crystalliform spars, composed of two pyramids, joined base to base, without any intermediate column: the diexahedria are dodecahedral, or composed of two hexangular pyramids. See the article SPAR.

DIFFAMATORY, a term chiefly used in the phrase diffamatory libel, signifying a writing intended to scandalize or discredit a person, &c.

By the roman law, and the antient ordonnances of France, the authors of diffamatory libels were punished with death.

DIFFARREATION, in roman antiquity, a ceremony whereby the divorce of the priests was solemnized, or the dissolving of marriage contracted by confarreation. See the article CONFARREATION.

Vigenere will have confarreation and diffarreation to be the same thing.

DIFFERENCE, in logic, signifies an essential attribute belonging to any species that is not found in the genus, and is the universal idea of that species: thus, body and spirit are two species of substance, which contain in their ideas something more than is in that of substance. In a body, we find impenetrability and extension; in a spirit, a power of thinking and reasoning; so that the difference of body is impenetrable extension, and the difference of a spirit is cogitation.

DIFFERENCE, in mathematics, is the remainder, when one number or quantity is subtracted from another.

It was a fundamental principle among the antient geometers, that the difference of any two unequal quantities, by which the greater exceeds the lesser, may be added to itself till it shall exceed any proposed finite quantity of the same kind. This principle seems inconsistent with the supposition of an infinitely small quantity, or difference, which added to itself by any number of times, is never to be supposed to become equal to any finite quantity whatsoever, which is the foundation of the modern method of infinitesimals: however, this last may, with proper caution, be made useful and accurate.

DIFFERENCE *of longitude*, of two places on the earth, is an arch of the equator, comprehended between the meridians of these two places.

DIFFERENCE *of ascension*. See the article ASCENSIONAL DIFFERENCE.

DIFFERENCES, in heraldry, certain additaments to coat armour, whereby something is added or altered to distinguish younger families from the elder.

Of these differences Sylvanus Morgan gives us nine, *viz.* the label, for the first son; the crescent, for the second; the mullet, for the third; the martlet, for the fourth; the annulet, for the fifth; the flower de lis, for the sixth; the rose, for the seventh; the eight-foil, for the eighth; and the cross moline, for the ninth. See LABEL, CRESCENT, &c.

Again, as the first differences are single for the sons of the first house or descent, the sons of the younger house are differed by combining or putting the said differences upon each other. As the first differences are the label, crescent, &c. for the first house, the difference for the second house is the label on a crescent for the first of that house; for the third brother of the second house, a mullet on a crescent, &c.

The original difference is controverted: Camden will have them to have begun about the time of king Richard: Paradin assigns differences worn as early as the year 870; wherein he contradicts the opinion of the president Fauchet, who says, arms were not hereditary in the french families, till after the time of Lewis the Gros, who came to the crown in the year 1110.

DIFFERENTIAL CALCULUS. See the article CALCULUS DIFFERENTIALIS.

DIFFERRENTIAL, *differentialis*, in the doctrine of logarithms, a term used by Kepler for the logarithms of tangents, which we call artificial tangents. See the articles

articles LOGARITHM and TANGENT.

DIFFERENTIO-DIFFERENTIALIS CALCULUS, is a method of differencing differential quantities.

We have obferved, under the word calculus, that the differential of a quantity is expreffed by the letter d prefixed to it, as the differential of x is called $d\,x$; we are to remark, therefore, in this place, that the differential of dx, is ddx; and the differential of ddx, is $dddx$; or, as Sir Ifaac Newton would exprefs it, $\dddot{x}$, &c. Thefe differentials may be expreffed more compendioufly thus, $d^2\,x$, $d^3\,x$, &c. whence we have powers or degrees of differentials. The differential of an ordinary quantity, is called a differential of the firft degree, as dx. The differential of the fecond degree, is an infinitefimal of a differential quantity of the firft degree, as ddx, $dx\,dx$, or dx^2, $dx\,dy$, &c. The differential of the third degree, is an infinitefimal of a differential quantity of the fecond degree, as $dddx$, dx^3 $dx\,dy\,dz$, and fo on.

The powers of differentials are differenced after the fame manner as the powers of ordinary quantities: and as compound differentials either multiply or divide each other, or are perfect or imperfect powers of differentials of the firft degree, the differentio-differentialis calculus is in effect the fame with the differential calculus. See the article CALCULUS DIFFERENTIALIS.

For the ufe of the differentio-differentialis calculus, fee Wolfii Elementa Analyfeos, par. 2. fect. iv.

DIFFORM, *difformis*, an appellation given to things whofe appearance is irregular, in contradiftinction to uniform. See the article UNIFORM.

It is much ufed in the defcription of plants of the fyngenefia clafs, or thofe with compound flowers, when the partial flowers, or fmaller flofcules, happen to be of different kinds. See the article FLOWER.

DIFFUSE, an epithet applied to fuch writings as are wrote in a prolix manner. Among hiftorians, Salluft is reckoned fententious, and Livy diffufe. Thus alfo among the orators, Demofthenes is clofe and concife; Cicero, on the other hand, is diffufe.

DIFFUSION, the difperfion of the fubtile effluvia of bodies into a kind of atmofphere all round them. Thus the light diffufed by the rays of the fun, iffues all round from that amazing body of fire; and thus are the magnetic particles diffufed every where round about our earth, and parts adjacent to it.

The fchoolmen make three kinds of diffufion. 1. That by which a pure quality is diffufed, as light, force, &c. 2. That performed by the motion of bodies, as the diffufion of found, fmell, magnetic and electric bodies, &c. And, 3. That performed partly by the motion of corpufcles, and partly by the motion of a quality. Thus, fay they, fire is diffufed.

DIGASTRICUS, in anatomy, a mufcle of the lower jaw, called alfo biventer. See the article BIVENTER.

Mr. Monro affures us, that the digaftric mufcles not only pull down the lower jaw, but ferve to draw up the os hyoides, and parts annexed to it, in deglutition. See the Medical Effays, vol. I. art. 11.

DIGEST, *digeftum*, in matters of literature, a collection of the decifions of the roman lawyers properly digefted, or arranged under diftinct heads, by order of the emperor Juftinian. It conftitutes the firft part or volume of the civil law.

DIGESTER, or DIGESTOR. See the article DIGESTOR.

DIGESTION, in medicine, is the diffolution of the aliments into fuch minute parts as are fit to enter the lacteal veffels, and circulate with the mafs of blood.

Various are the fyftems and hypothefes framed by phyficians and philofophers to account for digeftion. Some contend that it is done by a kind of elixation of the folid and groffer parts of the food in the liquid by the heat of the ftomach, and of the adjacent parts, the liver, fpleen, &c. Others will have it done by attrition, as if the ftomach, by thofe repeated motions, which are the effects of refpiration, rubbed off the minuter particles from the groffer matters, and agitating the reft againft each other, attenuated and diffolved them. See TRITURATION. Others think the bilious juice, others the fpirits chiefly concerned in digeftion. Others will have the food diffolved by a menftruum; but then they are greatly divided as to the nature and origin of this menftruum; fome fuppofing it an acid furnifhed by the glands of the ftomach; others, a nitro-aerial fpirit, which by penetrating the mafs of food, breaks the connection of the moft folid parts: and others, a faline juice, which divides and volatilizes the parts of the food. Others, again, fuppofe digeftion to be performed by means of a ferment or leaven, which mixing with the aliment,

aliment, excites an inteſtine motion in the parts thereof, by which means the parts are attenuated and diſſolved. But theſe likewiſe differ in their opinion of this ferment: ſome taking it to be the remains o the food laſt digeſted, which, by its continuance in the ſtomach, has contracted an acid quality and become a ferment: others take the principles of fermentation to be contained in the aliment itſelf, which when incloſed in the ſtomach, heated there, and put in motion, enters on its office of fermentation: others ſuppoſe the matter of the ferment ſupplied by the glands of the ſtomach; and laſtly, others contend for the ſaliva, and make that the ferment ſerving principally for the digeſtion of the food. See the article FERMENTATION.

Some ſuppoſe digeſtion owing to gentle heat and motion. By this heat and motion, ſay they, the texture of the nouriſhment is changed in the bodies of animals; and then the conſtituent ſolid parts are indued with peculiar attractive powers of certain magnitudes, by which they draw, out of the fluids moving through them, like parts in certain quantities, and thereby preſerve their forms and juſt magnitudes. And, to mention no more, Boerhaave very juſtly, in our opinion, aſcribes digeſtion to the joint action of ſeveral of the above-mentioned cauſes, aided by the expanſion of the air contained in the aliments. See the articles CHYLE, CHYLIFICATION, BLOOD, *&c.* MASTICATION, NUTRITION, *&c.*

Want of DIGESTION, a diſeaſe attended with pain, and a ſenſe of weight with eructations and copious flatulencies from corrupt humours in the ſtomach. See APEPSY.

It generally ariſes from a bad diet, particularly from eating too plentifully, eſpecially fat and oily aliments, with a ſedentary life and idleneſs. When the humours are corrupt, after a vomit, laxatives ſhould be uſed: afterwards with a ſpare diet, ſtomachics and ſtrengtheners, with exerciſe, and abſtinence from ſtudies. The uſe of ſpaw, or chalybeate waters is very efficacious for the cure of this diſeaſe. In almoſt all weakneſſes of the ſtomach, chewing of rhubarb is convenient, eſpecially in thoſe that are coſtive.

DIGESTION, in chemiſtry, pharmacy, *&c.* the ſubjecting bodies, included in proper veſſels, to the action of a gentle and continued heat.

The application of this operation, in regard to its end, is very various. In ſome caſes, it is uſed with a view of producing a change in ſome one ſingle body, as in the inſtance of the preparation called mercurius præcip. per ſe; in others, to promote ſolutions, or other combinations; but moſt frequently for extraction or ſeparation, by means of fluids, of the required parts of ſome ſolid bodies, whoſe texture, impeding the quicker acceſs and effect of menſtrua, renders a long infuſion, and the relaxation of a gentle heat, neceſſary, in order to their being penetrated; or for accelerating the ſolution of bodies by menſtrua, whoſe action when cold is not ſufficiently vigorous.

The veſſels generally uſed to contain the matter to be digeſted, are matraſſes, or bolt-heads, and ſometimes glaſſes; but where the heat is ſo gentle as to make no evaporation, the ſtructure is indifferent. In caſes where an evaporation does happen, and the exhaling fluid is of any value, the veſſels are to be conſtructed ſo as to confine the vapour, and return it in a condenſed ſtate. This is called circulation, and is commonly executed by inverting the neck of a ſmaller matraſs into that of a larger, in which caſe the conjoined glaſſes are called a pelican. There are ſeveral other kinds of pelicans of a more complex ſtructure, but the flaſk uſed for Florence wine, diveſted of the ſtraw work, and inverted into a matraſs, with a very long neck, will conveniently anſwer all the purpoſes. See CIRCULATION.

This operation is moſt generally performed in a ſand-heat, and no greater adjuſtment of the degrees of heat is neceſſary for the purpoſes of pharmacy, than can be there effected; but formerly when the more myſterious and operoſe methods were followed, the heat of dunghills has been employed.

The degree of heat requiſite in digeſtion, differs according to the nature of the ſubject: in tinctures, made with ſtrong ſpirit of wine, or volatile ſalts, and in ſolutions where a great effervеſcence is apt to ariſe, a very gentle one ſhould never be exceeded. In aqueous ſolution, and moſt other caſes, a greater may be allowed; but it muſt always be underſtood to be leſs than will make the matter boil, otherwiſe the operation comes not within the proper meaning of the word digeſtion, which is a diſtinction from coction.

The time which digeſtion ought to be

 continued,

continued, differs ſo greatly, according to the different application of the operation, that no other rule for it can be laid down, than that it ſhould be continued till the intention to which it is made ſubſervient be compleated.

In circulatory digeſtions it is proper to lute the veſſels, to prevent the eſcape of the vapours through the junctures, but in many caſes this following precaution is extremely neceſſary, *viz.* that a ſmall aperture, or vent, be left, otherwiſe an incondenſible vapour, which ariſes, will, if it cannot force the lute, inevitably burſt the glaſſes. The inſtances in which this precaution is neceſſary, are all mixtures of acid ſpirits, with earths, metals, or alcaline ſalts; or of ſuch ſalts of thoſe ſubſtances which can be acted on by them. But in ſolution of ſalts in water, and in extracts of gums, or reſins, made with volatile ſalts, wine, or ſpirits of wine, it may be ſafely omitted. The college of London have, in their diſpenſatory, as well according to the laſt edition as the former, uſed the word digeſtion in a ſenſe different from the above definition, meaning by it only the ſuffering the ingredients of certain mixtures to be continued together without applying the uſe of heat, which they expreſly order on each occaſion to be applied or omitted, by ſaying, *digeſt with heat*, or *digeſt without heat*: this is confounding the ſenſe of the word digeſt, with that of the word infuſe. See the article INFUSION.

DIGESTION, among phyſicians, is uſed for maturation, or that ſtate of a diſeaſe, when the morbific matter is ſo changed in bulk, figure, coheſion, mobility, &c. by the uſe of proper medicines, or even by the force of nature, as to be leſs noxious and hurtful, and conſequently to abate the violence of the diſtemper. See the article DIGESTIVE.

DIGESTION, in ſurgery, is the diſpoſing of an ulcer or wound to ſuppurate, or to diſcharge good pus, by the application of proper medicines. See the next article.

DIGESTIVE, in medicine, ſuch remedies as ſtrengthen and increaſe the tone of the ſtomach, and aſſiſt in the digeſtion of foods. See the article DIGESTION.

To this claſs belong all ſtomachics and ſtrengthners, or corroborants.

DIGESTIVE, in ſurgery, ſuch medicines as are applied to wounds, &c. in order to promote a good maturation and laudable ſuppuration of matter. Lenient, anodyne, and balſamic digeſtives, are to be applied to a gangrene. Digeſtives of turpentine, and the yolks of eggs, are uſeful in abſceſſes, wounds, and ulcers. See the article SUPPURATIVES.

DIGESTOR, in chemiſtry, a ſtrong veſſel made of copper, or iron, and fitted with a cloſe cover and ſcrews; ſo as to remain perfectly tight in a conſiderable degree of heat, whilſt water, common air, and the ſubject of the operation are contained therein. See the article DIGESTION.

The cover of the digeſtor ſhould always be provided with a valve to let out the ſteam, otherwiſe the veſſel will certainly burſt, whereby it may prove fatal to the by-ſtanders.

Of all chemical veſſels hitherto invented, the digeſtor ſeems beſt calculated for increaſing the action of menſtruums. Water, confined in a digeſtor, is ſuſceptible of ſo much heat, as to melt lead; and it is frequently found to melt the ſolder of lead and tin, wherewith the copper veſſel was held together: here appears the neceſſity of uſing hard ſolder, made of ſpelter, or ſilver and braſs, for this purpoſe; otherwiſe, the digeſtor cannot contain the water, when much heated, without melting in the joints.

In this veſſel, freſh ox-bone will be ſo digeſted in the ſpace of a quarter of an hour, as to become ſoft and tender, and capable of being cut with a knife; and the water, in which it was boiled, turned into a hard jelly, and a large cake of fat on its ſurface, when all is properly cooled.

DIGGING, among miners, is appropriated to the operation of freeing any kind of ore from the bed or ſtratum in which it lies, where every ſtroke of their tools turns to account; in contradiſtinction to the openings made in ſearch of ſuch ore, which are called hatches or eſſay-hatches, and the operation itſelf, tracing of mines, or hatching. See the articles TRAINING and MINE.

When a bed of ore is diſcovered, the beele-men, ſo called from the inſtrument they uſe, which is a kind of pick-ax, free the ore from the foſſils around it, and the ſhovel-men throw it up from one ſhamble to another, till it reaches the mouth of the hatch.

In ſome mines, to ſave the expence as well as fatigue of the ſhovel-men, they raiſe the ore by means of a winder, and two buckets, one of which goes up as the other comes down.

Digging a badger, among hunters, is dislodging or raising him out of the earth.

DIGIT, digitus, in astronomy, the twelfth part of the diameter of the sun or moon, is used to express the quantity of an eclipse. Thus an eclipse is said to be of six digits, when six of these parts are hid.

Digits, or Monades, in arithmetic, signify any integer under 10, as 1. 2. 3. 4. 5. 6. 7. 8. 9.

Digit is also a measure taken from the breadth of the finger. It is properly ¾ of an inch, and contains the measure of four barley corns laid breadth-wise.

DIGITALIS, fox glove, in botany, a genus of the didynamia angiospermia class of plants, with a monopetalous and campanulated, or bell fashioned flower, quadrifid at the edge: the fruit is an oval, acuminated, and bilocular capsule, containing a great number of small seeds. See plate LXXII. fig. 6.

The leaves and flowers of this plant, the only parts used in medicine, are reputed emetic and vulnerary.

DIGITATED, among botanists, an appellation given to compound leaves, each of which is composed of a number of simple foliola, placed regularly on a common petiole; though, strictly speaking, there must be more than four foliola to make a digitated leaf. See plate LXXIII. fig. 7.

DIGLYPH, in architecture, a kind of imperfect triglyph, console, or the like, with two channels or engravings, either circular or angular. See the article Triglyphs.

DIGNE, a city and bishop's see of Provence, in France, fifty-five miles north of Toulon: east long. 6° 5′, and north lat. 44° 6′.

DIGNITARY, in the canon law, a person who holds a dignity, that is, a benefice which gives him some pre-eminence over mere priests and canons. Such is a bishop, dean, arch-deacon, prebendary, &c. See Bishop, Dean, &c.

DIGNITY, as applied to the titles of noblemen, signifies honour and authority. As the omission of a name of dignity may be pleaded in abatement of a writ; so may it be where a peer or nobleman, who has more than one name of dignity, is not named by that which is most noble.

Dignity, in the ecclesiastical sense, is defined by canonists, an administration joined with jurisdiction and some power. Simple prebendaries, therefore, without jurisdiction, are not dignities.

Dignities are sometimes simple, sometimes with cure of souls, and sometimes with jurisdiction and administration of sacred things. Camden reckons in England, including prebends, 544 ecclesiastical dignities. See the article Dignitary.

DIGYNIA, in the linnæan system of botany, an order of plants, or a subdivision occurring in most of the classes established by Linnæus, intimating the plant to have two styles. See the article Botany.

DIHELIOS, in astronomy, a name given by Kepler to that ordinate of the ellipsis which passes through the focus, where the sun is supposed to be placed.

DIJAMBUS, in antient poetry, a double iambus. See the article Iambus.

DIJON, the capital of the province of Burgundy, in France, situated on the river Ouche, 140 miles south east of Paris: east long. 5° 5′, and north lat. 47° 15′.

DIKE, a ditch, or drain, made for the passage of waters. See the article Ditch, &c.

Dike also signifies a work of stone, timber, earth, fascines, &c. raised to oppose the entrance of the waters of the sea, a river, lake, &c.

The most stupendous works of this kind are the Dikes of Holland. See the article Sluice.

Dike-reeve, an officer who takes care of the dikes and drains in Lincolnshire.

DILAPIDATION, in law, a wasteful destroying or letting buildings, especially parsonage houses, &c. run to decay, for want of necessary reparation. If the clergy neglect to repair the houses belonging to their benefices, the bishop may sequester the profits thereof for that purpose. And in these cases, a prosecution may be brought either in the spiritual court, or at common law, against the incumbent himself, or against his executor or administrator.

DILATATION, in physics, a motion of the parts of any body, by which it is so expanded as to occupy a greater space. This expansive motion depends upon the elastic power of the body, whence it appears that dilatation is different from rarefaction,

faction, this laft being produced by the means of heat. See the article RAREFACTION.

Gaffendus and his followers affirm, that dilatation, by whatever caufe it is produced, cannot happen without vacuities interfperfed in the parts of the expanded body; on the other hand, the Cartefians teach that dilatation is performed by the intrufion or intromiffion of fome fubtile matter into the pores of the dilated body.

The moderns obferve, that bodies, which being compreffed, and afterwards left at liberty to reftore themfelves perfectly, endeavour to dilate themfelves with the fame force, whereby they were compreffed, and accordingly they fuftain a force, and raife a weight equal to that by which they were compreffed. They likewife remark, that bodies in dilating by their elaftic power, exert a greater force at the beginning of their dilatation than towards the end, as being at firft more compreffed: and the greater the compreffion, the greater the elaftic power and energy of dilatation. Wherefore thefe three, the compreffing power, the compreffion, and the elaftic power, are always equal. Again, the motion whereby compreffed bodies reftore themfelves is for the moft part accelerated. Thus an arrow fhot from a bow does not quit the ftring till after it be perfectly reftored to its natural ftate; nor does the arrow move fwifter than the ftring: and if the ftring before it hath perfectly reftored itfelf be ftopped, the arrow will not go its full length; a proof that it is continually acquiring a new impetus from the ftring.

It may however happen, that where the compreffion is only partial, the motion of dilatation fhall not be accelerated, but retarded, as appears in the compreffion of foft bread, fpunge, gauze, &c.

DILATATION, in furgery and anatomy, denotes the widening the orifice of a wound; or the diftenfion of any veffel, or the like.

DILATATORES, in anatomy, a name given to feveral mufcles in the human body; as, 1. Dilatores alæ nafi, a pair of mufcles which ferve to elevate the nofe, and are very various in different fubjects. In general, however, they are two on each fide, though even in this they vary extremely, and fometimes are fo thin and fine as fcarce to be perceptible. They are alfo called the pyramidalis and myrtiformis. See the article PYRAMIDALIS, &c.

2. Dilatatores urethræ, of which the tranfverfi arife from the tubercle of the os ifchium on each fide, and are inferted into the pofterior part of the bulb of the urethra: they are not quite determinate and certain, however, either in their origin or infertion, and fometimes they are wholly wanting. When they act they dilate the urethra in its pofterior part. The dilatator pofticus arifes from the anterior part of the fphincter of the anus, and is inferted into the pofterior and lower part of the acceleratores, or elfe into the lower part of the bulb of the urethra. Some have taken this mufcle for a part of the fphincter ani. See the article SPHINCTER.

DILEMMA, in logic, an argument confifting of two or more propofitions, which divides the whole into all its parts, or members, by a disjunctive propofition, and then infers fomething concerning each part, which is finally referred to concerning the whole.

Inftances of this are frequent, as, "In "this life we muft either obey our vi"cious inclinations, or refift them: to "obey them will bring fin and forrow; "to refift them is laborious and painful: "therefore, we cannot be perfectly free "from forrow and pain in this life."

A dilemma becomes faulty or ineffectual three ways. Firft when the members of the divifion are not well oppofed, or not fully enumerated: for then the major is falfe. Secondly, when what is afferted concerning each part is not juft, then the minor is not true. Thirdly, when it may be retorted with equal force upon him who utters it. There was a famous antient inftance of this cafe, wherein a dilemma was retorted. Euathlus promifed Protagoras a reward when he had taught him the art of pleading; and it was to be paid the firft day he gained any caufe in court. After a confiderable time, Protagoras goes to law with Euathlus for the reward, and ufes this dilemma. "Either the caufe will "go on my fide or on yours: if the "caufe goes on my fide, you muft pay "me according to the fentence of the "judge: if the caufe goes on your "fide, you muft pay me according to

"your bargain. Therefore, whether the "cause goes for me, or against me, you "must pay the reward." But Euathlus retorted the dilemma thus. "Either I "shall gain the cause, or lose it. If I "gain the cause, then nothing will be "due to you according to the sentence of "the judge: but if I lose the cause, no-"thing will be due to you according to "my bargain. Therefore, whether I "lose or gain the cause, I will not pay "you, for nothing will be your due."

A dilemma is usually described, as tho' it always proved the absurdity, inconvenience, or unreasonableness of some opinion or practice, and this is the most common design of it. But it is plain, that it may be used to prove the truth or advantage of any thing proposed. As, "In heaven we shall either have de-"sires, or not: if we have no desires, "then we have full satisfaction: if we "have desires, they shall be satisfied as "fast as they arise: therefore, in heaven "we shall be completely satisfied."

This sort of argument may be composed of three or more members, and may be called trilemma. It is also called *syllogismus cornutus*, a horned syllogism; its horns being so disposed, that if you avoid the one, you run against the other. It is also called crocodilinus, by reason that as the crocodile leads such as follow it, into the Nile, and pursues such as fly it, to destroy them; so, whatever the adversary either affirms or denies in this kind of syllogism, is turned to his advantage.

DILL, ANETHUM, in botany, a genus of the pentandria digynia class of plants, the compound flower of which is uniform; the particular ones all consisting of five lanceolated petals, bending inwards: the fruit is naked, ovated, compressed, and separable into two parts; and the seeds are two in number, suboval, convex, and striated on one side, and plane on the other.

To this genus Linnæus likewise refers fennel, which differs only from dill, in that its seeds are not membranaceous at the edge, like those of dill.

The seeds of dill are recommended as good carminatives.

DILLEMBURG, a city of the circle of the Upper Rhine, in Germany, about forty miles north of Francfort, and subject to the house of Nassau: east longitude 8° 8', and north latitude 50° 45'.

DILLENGEN, a city of Swabia, in Germany, situated on the Danube, about twenty miles north east of Ulm: east long. 10° 20', and north lat. 48° 40'.

DILLENIA, in botany, a genus of the polyandria-polygynia class of plants; the corolla of which consists of five coriaceous, large, roundish, and hollow petals: the fruit is roundish, and externally covered with a number of capsules, which are oblong, and divided by a furrow; within, there is a large column or pulpous receptacle: the seeds are numerous, and very small; and nidulated underneath the capsules.

DILUTING, in chemistry, is to render a body liquid; or, if it were liquid before, to render it more so, by the addition of a thinner thereto. These things thus added, are called diluents, or dilutors. It is requisite for a diluent, that it be fluid, that it be more fluid than the liquor to be diluted; and finally, that it retain its fluidity after a mixture. It is observed, that there is no body endued with these three properties besides water. Wine indeed is said to dilute; but its diluent power depends on its quality, joined with its stimulating force. Water, if it be made warm, dilutes the more.

DIMENSION, in geometry, is either length, breadth, or thickness; hence a line hath one dimension, *viz.* length; a superficies two, *viz.* length and breadth; and a body, or solid, has three, to wit, length, breadth and thickness.

DIMENSION is also used with regard to the power of the roots of an equation, which are called the dimensions of that root; as in a cubic equation, the highest power has three dimensions, &c.

DIMINISHED COLUMN, in architecture. See the article COLUMN.

DIMINISHED INTERVAL, in music, is a defective interval, or an interval that is short of its just quantity, by a lesser semitone, &c. See the article INTERVAL.

DIMINUTION, in architecture, a contraction of the upper part of a column, by which its diameter is made less than that of the lower part.

It generally commences from one third of the height of the column.

Vitruvius would have the diminution of columns different according to their height, and not according to their diameter. But this rule is not found to have been observed in the antique. Mr. Perrault observes, that a difference of orders does not infer a difference in diminutions, and Mr. Le Clerc says, all diminu-

diminutions of columns ought to be more or lefs fenfible according as the orders are more or lefs delicate. For inftance, in the Tufcan order, where the column is fifteen modules high, the diminution under the aftragal may be five minutes and a half. In the Doric order, where the column is fixteen modules, the diminution may be but five minutes. In the Ionic, where the column is eighteen modules, the diminution may be but four minutes and a half; and in the Corinthian, no more than four. Diminutions are as differently adjufted in antique buildings, as in different modern authors.

DIMINUTION, in heraldry, a term ufed for what the french call brifures, and we denominate differences more ufually. See the article DIFFERENCE.

DIMINUTION, in law, is where the plaintiff or defendant in a writ of error alledges to the court, that part of the record remains in the inferior court not certified, and therefore prays, that it may be certified by certiorari. Diminution cannot be alledged of what is fully certified, but of fomething that is wanting, as the want of an original, or a warrant of attorney.

DIMINUTION, in mufic, is when there are feveral words which are to make tones, and feveral quick motions in a cadence, feveral quavers, femi-quavers, *&c.* correfponding to a crotchet or minum, as when a femi-breve is divided into two minims, four crotchets, *&c.* Of this there are feveral kinds, and if done in conjoint degrees, it is called trilli, tremoli, circoli mezzi, group, tirate, and if in disjoint degrees, it is faid to be done per falto.

DIMINUTION, in rhetoric, the exaggerating what you have to fay by an expreffion that feems to diminifh it.

DIMINUTIVE, in grammar, a word formed from fome other, to foften or diminifh the force of it, or to fignify a thing is little in its kind. Thus cellule is a diminutive of cell, globule of globe, hillock of hill. The Italians abound in diminutives: the French are a good deal more referved: in englifh we have very few. The Latins, and efpecially Catullus, ufe them as expreffions of blandifhment, and in that language, as well as in the Italian, French and Englifh, they are generally formed from primitives by the addition of a few letters or fyllables. They have a very pretty effect in that celebrated addrefs of Adrian to his departing foul, which begins,

Animula, vagula, blandula,
Hofpes comefque corporis, &c.

DIMISSORY LETTERS, in the antient chriftian church, were letters granted to the clergy, when they were to remove from their own diocefe, and fettle in another, to teftify that they had the bifhop's leave to depart. In the canon-law, dimiffory letters are fuch as are ufed when a candidate for holy orders has a title in one diocefe, and is to be ordained in another: in which cafe the proper diocefan fends his letters directed to the ordaining bifhop, giving leave that the bearer may be ordained to fuch a cure within his diftrict. Perfons inferior to bifhops cannot grant thefe letters, unlefs by fpecial commiffion; or unlefs the bifhop be at a great diftance, in which cafe the vicar general may grant fuch licence; as the chapter may do, *fede vacante.*

DIMOERITÆ, in church-hiftory, a name given to the Apollinarians, from their feparating the underftanding from the human foul of Chrift.

DIMNESS OF SIGHT, a diforder in horfes, proceeding from blood-fhotten eyes. If the ball of the eye be found, the cure is effected by keeping the horfe warm, with a hood of linen cloth fitted to his head; and anointing the eyelids twice a day, with a compofition of fugar-candy, honey, and white rofe-water. In two or three days, the eyes will be well again, after which the creature fhould be blooded. In this diforder, you ought by no means to clip or meddle with the bladders on any part of the eye.

DINANT, a town of Germany, in the bifhopric of Liege, fituated on the river Maefe, about 12 miles fouth of Namur: eaft long. 4° 50′, and north lat. 50° 18′.

DINANT is alfo the name of a town of Brittany, in France, about ten miles fouth of St. Malo: weft longitude 2° 5′, and north latitude 48° 30′.

DINGELFING, a town of Bavaria, in Germany, fituated on the river Ifer, twenty miles fouth of Landfhut: eaft longitude 12° 40′, and north latitude 48° 30′.

DINGLE, a port town of Ireland, in the county of Derry, and province of Munfter, fituated on Dingle-bay, 74 miles weft of Limerick: weft longitude 10° 18′, and north latitude 52°.

DINGWEL, or DINGWAL, a parliament-town of Scotland, ſituated at the weſt end of the Cromarty-bay, in the county of Roſs: weſt longitude 4° 15′, north latitude 57° 56′.

It claſſes with Dornoch, Wick, and Kirkwall.

DINKELSPIEL, a city of Swabia, about forty miles north of Ulm, eaſt long 10° 12′, and north lat. 49°.

DINNER, the meal taken about the middle of the day.

It is generally agreed to be the moſt ſalutary to make a plentiful dinner, and to eat ſparingly at ſupper. This is the general practice among us. The French, however, in imitation of the antient Romans, defer their good cheer to the evening, and Bernardinus Paternus, an eminent italian phyſician, maintains it to be the moſt wholeſome method, in a treatiſe expreſsly on the ſubject.

The grand Tartar, emperor of China, after he has dined, makes publication by his heralds, that he gives leave for all the other kings and potentates of the earth to go to dinner, as if they waited for his leave.

DIOCESE, denotes a particular diſtrict, or diviſion, under the direction and government of a biſhop.

It is the general opinion, that the chriſtian church, in the modelling her own external polity, followed the ſtate and diviſion of the roman empire, and that the eccleſiaſtical magiſtracy was originally formed upon the plan of the civil. As the empire therefore was divided into provinces and dioceſe., (a dioceſe, according to Conſtantine's diſtribution, comprehending ſeveral provinces under the direction of a general magiſtrate) ſo the church ſet up her metropolitical and patriarchal power, the metropolitan biſhops anſwering to the civil maſtriſtrates of provinces, and the patriarchs to the civil magiſtrates of dioceſes. This is to be underſtood of the ſtate of the church, after the empire became chriſtian. See the articles METROPOLITAN, PATRIARCHS, PROVINCE, &c.

Some pretend that a dioceſe, during the three firſt centuries, was never more than ſuch a number of people as could meet, and ordinarily did meet, in a ſingle congregation: others extend the limits of the antient dioceſes, ſo as to include a whole city, and the region about it. And this is the plain reaſon of that great difference we find in the extent of antient dioceſes, ſome being very large, others very ſmall, according as each city happened to have a larger or leſſer territory under its juriſdiction. Dioceſes were originally called παροικίαι, pariſhes, by which name is to be underſtood the epiſcopal city, with the country places and villages round it. The name dioceſe began firſt to be uſed in the fourth century, when the exterior polity of the church began to be formed upon the model of the roman empire.

England, in regard to its eccleſiaſtical ſtate, is divided into two provinces, *viz.* Canterbury and York, and each province into ſubordinate dioceſes, of which there are twenty-two in England, and four in Wales.

DIOCLESIAN EPOCHA, in chronology. See the article EPOCHA.

DIOCLIA, διοκλεια, in grecian antiquity, a feſtival kept in honour of Diocles, who died in defence of a youth he loved.

DIOCTAHEDRIA, in natural hiſtory, a genus of pellucid and cryſtalliform ſpars, compoſed of two octangular pyramids, joined baſe to baſe, without any intermediate column. Of theſe ſome have long pyramids, others ſhort and ſharp-pointed ones, and others ſhort and obtuſe-pointed ones; the two former ſpecies being found in the Hartz-foreſt, and the laſt in the mines of Cornwal.

DIODIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the corolla of which conſiſts of a ſingle petal, of the ringent kind. The tube is ſlender and longer than the cup, the upper lip is erect and bifid, the lower lip is patent, and divided into two lanceolated ſegments. The fruit is an oval quadrangular capſule, coronated, formed of two valves, and containing two cells: the ſeeds are ſingle, of an ovato-oblong figure, ſmooth and flat on one ſide, and convex on the other.

DIOECIA, in the linnæan ſyſtem of botany, the twenty-ſecond claſs of plants, comprehending all thoſe which have the male and female parts of fructification, or the ſtamina and piſtil, on diſtinct plants of the ſame kind; in which reſpect, they bear ſome analogy to quadrupeds, whoſe males and females are likewiſe diſtinct. See BOTANY.

To this claſs belong the willow, hemp, poplar, juniper, piſtacchia, yew, &c. in all which, the female plants alone produce ſeeds; but even theſe prove barren, unleſs planted near the male plants,

fo as to be within the reach of the farina fœcundans. See FARINA FOECUNDANS.

DIOMEDIS AVIS, in ornithology, a bird of the duck-kind, about the fize of the common hen, and of a dufky brown colour, faid to be peculiar to the ifland Diomedia, or Tremiti, in the gulph of Venice.

DIONYSIA, in grecian antiquity, folemnities in honour of Διονυσος, or Bacchus, fometimes called by the general name of orgia; and by the Romans, bacchanalia, and liberalia. See BACCHANALIA, &c. There were divers Dionyfia obferved, over all Greece: but thofe celebrated at Athens had more fplendor and ceremonious fuperftition than in any other part; for the years were numbered by them: the chief archon had a fhare in the management of them, and the priefts that officiated therein, were honoured with the firft feat at public fhews. But at firft, they were without fplendor and ornaments, being days fet apart for public mirth, and obferved only with the following ceremonies: firft a veffel of wine, adorned with a vine branch, was brought forth, after that followed a goat; then was carried a bafket of figs; and after all the phalli. At fome of them, it was ufual for the worfhippers in their garments and actions to imitate the poetical fictions concerning Bacchus. They put on fawn fkins, fine linen and mitres, carried thyrfi, drums, pipes, flutes, and rattles, and crowned themfelves with garlands of trees, facred to Bacchus, fuch were the ivy, vine, fir, &c. Some imitated Silenus, Pan, and the Satyrs; expofing themfelves in comical dreffes, and antic motions: fome rode upon affes, others drove goats to the flaughter. In this manner, perfons of both fexes ran about the hills, defarts, and other places, wagging their heads, dancing in ridiculous poftures, filling the air with hideous noifes and yelling, perfonating people diftracted, and crying aloud, Εὐοὶ Σαβοὶ εὐοῖ, Βακχε, or ὦ Βακχε, or Ιοβακχε, or Ιὼ Βακχε.

In fome of the feftivals, a company of men called Περιφαλλια, carried long poles, at the end of which were fixed things in form of a man's privities. The λικνον, or myftical fan of Bacchus, was a thing effential to all his feafts.

DIONYSIACA, in grecian antiquity, an appellation given to all manner of theatrical entertainments, from their being facred to Dionyfius, or Bacchus.

DIONYSIAN PERIOD, in chronology. See the article PERIOD.

DIOPTER, DIOPTRA, a name fometimes ufed for the hole pierced in fights of mathematical inftruments. See the article SIGHTS.

DIOPTRA, among furgeons, the fame with fpeculum. See SPECULUM.

DIOPTRICS, the fcience of refractive vifion, or that part of optics which confiders the different refractions of light in its paffing through different mediums, as air, water, glafs, &c. and efpecially lenfes. See the articles REFRACTION, LENS, &c.

DIOSCOREA, in botany, a genus of the dioecia-hexandria clafs of plants, having no corolla in either the male or female flowers: the fruit is a compreffed large capfule, of a triangular form, containing three valves, and divided into three cells: the feeds are two, compreffed, and furrounded, with a large membranaceous margin.

DIOSCURIA, Διοσκουρια, in grecian antiquity, a feftival kept in honour of the Diofcuri, or Caftor and Pollux, wherein the affiftants fhared plentifully of the gifts of Bacchus.

DIOSMA, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which confifts of five obtufely ovated, feffile, and erecto-patent petals, of the length of the cup: the fruit is compofed of five capfules, adhering together by their inner fides, and containing each a fingle, oblong, and fharp-pointed oval feed.

DIOSPYROS, DATE-PLUM, in botany, a genus of the octandria-digynia clafs of plants, called by Turnefort, guaiacana, the flower of which is monopetalous, very fmall, and of an oval campanulated figure: the fruit is a large globofe and multilocular berry, containing a few fharp-pointed oval feeds. See plate LXXIII, fig. 1.

DIPHRYGES, in antient pharmacy, the fcoriæ, fediment, or calx of melted copper, gathered in the furnace, when the metal was run out.

There are fuppofed to be three fpecies of diphryges, one made of a clay, or bole dried in the fun; another made of marcafite, or pyrites burnt; and a third, that of the fæces of copper. See the article COPPER.

The laft diphryges, which taftes of copper, is æruginous, aftringent, and vehemently drying upon the tongue, qualities of

of which burnt oker, though fold for diaphryges, is deftitute. It is an aftringent, a potent cleanfer, abfterfive and drier, repreffes excrefcences of flefh, induces malignant and fpreading ulcers to cicatrize, and mixed with turpentine, or cerate, difcuffes an abfcefs.

DIPHTHONG, δίφθογγος, in grammar, a double vowel, or the mixture of two vowels pronounced together, fo as to make one fyllable. See the article Vowel.

The Latins pronounced the two vowels in their diphthongs, *ae* or *æ*, *oe* or *œ*, much as we do, only that the one was heard much weaker than the other, tho' the divifion was made with all the delicacy imaginable. Diphthongs, with regard to the eyes, are diftinguifhed from thofe with regard to the ears: in the former, either the particular found of each vowel is heard in the pronunciation, or the found of one of them is drowned; or, laftly, a new found, different from either, refults from both: the firft of thefe only are real diphthongs, as being fuch both to the eye and the ear. Diphthongs with regard to the ear are either formed of two vowels, meeting in the fame fyllable, or vowels whofe founds are feverally heard; or of three vowels in the fame fyllable, which only afford two founds in the pronunciation. Englifh diphthongs, with regard to the eye and ear, are *ai*, *au*, *ea*, *ee*, *oi*, *oo*, *ou*. Improper englifh diphthongs, with regard to the eye only, are *aa*, *ea*, *eo*, *eu*, *ie*, *ei*, *oa*, *oe*, *ue*, *ui*.

DIPLASIASMUS, in medicine, a reduplication of difeafes.

This word is alfo ufed for two mufcles of the arm, which ferve to turn it round.

DIPLOE, in anatomy, the foft meditullium, or medullary fubftance, which lies betwixt the two laminæ of the bones of the cranium. See the article Cranium.

DIPLOMA, an inftrument or licence given by colleges, focieties, &c. to a clergyman to exercife the minifterial function, or to a phyfician to practife the profeffion, &c. after paffing examination, or admitting him to a degree.

Diploma, in chemiftry, &c. a double veffel. To boil in diplomate, is to fet one veffel, containing the ingredients intended to be acted upon, in another larger veffel, full of water, and to this laft the fire is to be applied.

DIPONDIUS, in the fcripture-language, is ufed by St. Luke to fignify a certain coin, which was of very little value: our tranflation of the paffage is, *Are not two fparrows fold for two farthings?* In St. Matthew, who relates the fame thing, we read, *Are not two fparrows fold for a farthing?* The greek reads *affarion* inftead of *as*. See As.

Dr. Arbuthnot fays that this coin was at firft *libralis*, or of a pound weight, and that even when diminifhed, it retained the name *libella*; fo that dipondius denoted two afes.

DIPPING, among miners, fignifies the interruption, or breaking off, of the veins of ore; an accident that gives them a great deal of trouble before they can difcover the ore again.

Dipping needle, or Inclinatory needle. See the article Needle.

DIPSACUS, teasel, in botany, a genus of the tetrandria-monogynia clafs of plants, the flower of which confifts of only one tubular erect petal, divided into four fegments at the mouth; its fruit is a common receptacle, of a conical figure, befet with long fcales, and containing a fingle columnar feed with a marginaceous rim. See plate LXXIII. fig. 2.

The leaves of wild teafel are recommended againft flatulencies, and crudities of the ftomach.

DIPTERA, in the hiftory of infects, that order of infects which have only two wings, and under each of them a ftyle or oblong body, terminated by a protuberance, or head, and called a balancer.

DIPTERE, or Dipteron, in the antient architecture, fignified a temple furrounded with two rows of columns, which form a fort of porticos, called wings, or ifles. Pfeudo-diptere is the fame, except that inftead of the double row of columns, this was only encompaffed with a row of fingle ones.

DIPTOTES, in grammar, are fuch nouns as have only two cafes, as *fuppetiæ*, *fuppetias*, &c.

DIPTYCHA, δίπτυχα, in antiquity, a public regifter, in which were written the names of the confuls and other magiftrates among the heathens; and among the chriftians, they were a fort of tablets, on one of which were written the names of the deceafed, and on the other thofe of the living patriarchs, bifhops, &c. or thofe who had done any fervice to the church, for whom prayers were offered, the deacon reading the names at mafs.

It is certain there were prophane diptycha in the greek empire, as well as facred ones in the greek church. The prophane diptycha were frequently fent as a prefent to

to princes, &c. on which occasion they were finely gilt and embellished, and usually of ivory. Carrion supposes that such presents were at first made to persons who had been nominated quæstors, to whom they were useful. Hence arose the custom of diptycha in the antient christian church; where some distinguish three sorts of diptycha, one wherein the names of bishops only were written, such especially as had been governors of that particular church; a second, in which the names of the living were written, such in particular as were eminent for any office or dignity, or some benefaction or good work, in which rank were bishops, emperors, and magistrates: lastly, a third, containing the names of such as were deceased in catholic communion. To erase a person's name out of these books, was the same thing as declaring him a heretic, or some way deviating from the faith.

DIRCA, in botany, a genus of the octandria monogynia class of plants, without any calyx; the corolla consists of a single clavated petal; the fruit is a berry, in which is a single cell, containing only one seed.

DIRECT, in arithmetic. The rule of three direct, is opposite to the rule of three inverse. See the articles RULE OF THREE and PROPORTION.

DIRECT, in astronomy. A planet is said to be direct, when it appears to an observer on the earth to go forward in the zodiac, or according to the succession of the signs. See the article PLANET.

DIRECT, in matters of genealogy, is understood of the principal line, or the line of ascendants and descendants; in contradistinction to the collateral line. The heirs in the direct line always precede those in the collateral lines.

DIRECT RAY, in optics, is a ray flowing from a point of a visible object directly to the eye, thro' one and the same medium.

DIRECT *east and west dials*, dials drawn upon planes that directly face the east and west points of the horizon, or parallel to the meridian. See the article DIAL.

DIRECT *south and north dials* are those which face directly the north and south points of the horizon, or parallel to the prime vertical circle. See the articles DIAL and DIALLING.

DIRECTION, in mechanics, signifies the line or path of a body's motion, along which it endeavours to proceed, according to the force impressed upon it. See the articles LINE and MOTION.

Angle of DIRECTION, that formed by the lines of direction of two conspiring powers.

Quantity of DIRECTION, a term used by some mathematicians for the product of the velocity of the common center of gravity of a system of bodies, by the sum of their quantities of matter: this is nowise altered by any collisions among the bodies themselves.

Magnetical DIRECTION denotes the tendency of the load-stone, and other magnetic bodies, to certain points called their poles: thus, a magnetical needle always presents one of its ends towards the north pole of the world, and the other towards the south pole.

DIRECTOR, in commercial polity, a person who has the management of the affairs of a trading company: thus we say the directors of the India-company, South-sea-company, &c. See the article COMPANY.

The directors are considerable proprietors in the stocks of their respective companies, being chosen by plurality of votes from among the body of proprietors. The dutch East-india company have sixty such directors; that of France, twenty-one; the british East-india company has twenty-four, including the chair-man, who may be re-elected for four years successively. These last have salaries of 150l. a year each, and the chair-man 200l. They meet at least once a week, and commonly oftener, being summoned as occasion requires.

But besides these directors, who reside in Europe, and there superintend the general œconomy of the trading companies, there are also officers belonging to them in Asia, Africa, and America, under the title of directors-general, and, by an honourable abbreviation, generals. The English give these the title of presidents, whereof there used to be two in the East-indies, one at Surat, and the other at Bantam. They have the absolute disposal of all the company's effects, regulate their trade, establish new compting-houses, and command all the merchants, and even captains of ships; make presents to princes, treat with them, make peace and war with them, &c. It is true, they have a council, but one entirely subservient to their pleasure.

DIRECTOR, in surgery, a grooved probe, to direct the edge of the knife or scissars, in opening sinuses, or fistulæ, that by this means the subjacent vessels, nerves, and tendons may remain unhurt. The ornament

ment at the upper part of it, see plate LXXIII. fig. 3. n° 1. serves for a handle; though sometimes that end is made in the form of a spoon, as in n° 2. to contain powders to sprinkle upon wounds or ulcers: sometimes also it is forked at the end, to divide the frænum of the tongue, as in n° 3.

DIRECTOR, in anatomy, the same with the erector penis. See ERECTOR.

DIRIGENT, or DIRECTRIX, a term in geometry, signifying the line of motion, along which the describent line or surface is carried in the genesis of any plane or solid figure: thus, if the line A B (plate LXXIII. fig. 4.) move along the line A C, so that the point A always keeps in the line A C, a parallelogram, as A B C D, will be formed, of which the side A B is the describent, and the line A C the dirigent; so also, if the surface A B C D be supposed to be carried along C E, in a position always parallel to itself, in its first situation, the solid ADFH, will be formed, where the surface A D is the describent, and the line C E the dirigent.

DIRITTA, in music, a term intimating that the piece is to be played or sung in conjoint degrees: thus, contrapunto alla diritta, according to Angelo Berardi, is when one is obliged to raise or fall the voice by the same degree, *i. e.* by an equal number ascending or descending, without making a leap, even of the interval of a third.

DIRSCHAW, or DIRSCHAU, a town of Prussia, in the palatinate of Culm, situated upon the Vistula, half way betweeen Dantzic and Ghnief.

DIS, an inseparable particle prefixed to divers words, the effect whereof is either to give them a signification contrary to what the simple words have, as *disoblige*, *disobey*, &c. or to signify a separation, detachment, &c. as *disposing*, *distributing*, &c.

DISABILITY, in law, is when a person is rendered incapable of inheriting lands, or taking that benefit which otherwise he might have done.

Disability may happen four ways, *viz.* by the act of an ancestor, by the act of the party himself, by the act of God, or by the act of the law.

Disability by the act of an ancestor is where a man being attainted by treason or felony, his blood becomes corrupted, and thereby his children are rendered incapable to inherit.

Disability by the act of the party, is when one binds himself by obligation, that, upon the surrender of a lease, he will grant a new estate of the same premises to the lessee, and afterwards he grants over the reversion to another, whereby he is disabled to perform his obligation.

Disability by the act of God, is where a person is not *sanæ memoriæ*, not of sound memory, which incapacitates him to make any grant, &c. and in all cases where he gives or passes an estate from him, after his death, it may be disannulled and made void; though it is a maxim in our law, that a man of full age shall never be received to disable his own person.

Disability by the act of the law, is where one, by the sole act of law, without any thing done by him, is rendered incapable of the benefit of the law, as an alien born, &c.

There are also, by the common law, other disabilities, as idiocy, infancy, and coverture, in respect to the making of grants, &c. and by statute in many cases; for papists are disabled to make any presentation to a church, or to purchase or take lands, &c. Officers not taking the oaths, to hold offices, &c.

DISARMING, in law, the prohibiting people to wear arms. See ARMS.

It is an offence, by the common law of England, for persons to go or ride armed with dangerous and uncommon weapons: though gentlemen may wear common armour, according to their quality. It is also ordained by statute, that no persons shall come before the king's justices with force of arms, on pain of imprisonment, &c.

DISARMING *the lips of a horse*, in the manege, is the preventing them from taking off the true pressure or appui of the mouth, when they happen to be so large as to cover the bars.

DISBURDENING *of trees*, the taking off part of the leaves and fruit, when too numerous, that those left may grow the larger.

DISC, *discus*, in antiquity, a quoit made of stone, iron, or copper, five or six fingers broad, and more than a foot long, inclining to an oval figure, which they hurled in the manner of a bowl, to a vast distance, by the help of a leathern thong tied round the person's hand who threw it, and put through a hole in the middle. Homer has made Ajax and Ulysses great artists at this sport; and Ovid, when he brings in Apollo and Hyacinth playing

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at it, gives an elegant defcription of this exercife, lib. x. ver. 175.

DISC, in aftronomy, the body and face of the fun and moon, fuch as it appears to us on the earth; or the body or face of the earth, fuch as it appears to a fpectator in the moon, &c. See DIAMETER. The difc in eclipfes is fuppofed to be divided into twelve equal parts, called digits: in a total eclipfe of the luminaries, the whole difc is obfcured; in a partial eclipfe, only a part thereof.

If we imagine a plane to pafs through the center of the earth, fo that the line which joins the centers of the fun and earth, may be perpendicular to this plane, it will make on the furface of the earth a circle, which will feparate the illuminated hemifphere of the earth from the dark. This circle, otherwife termed the circle of illumination, Mr. Keil calls the illuminated difc of the earth, which is directly feen by a fpectator placed at the diftance of the moon, in the right line which joins the centers of the fun and earth. All lines drawn from the center of the fun to every fingle point of the difc are to be accounted parallel; and, therefore, fince that line which is drawn to the center of the difc is perpendicular to it, all the reft will be perpendicular to it, and therefore all lines drawn from the center of the fun, and paffing through every point of any circle upon the earth's furface, when they are produced, will be perpendicular to the plane of the difc. Moreover, a fpectator in the moon will fee all countries, cities, and towns to move upon the difc, which motion is occafioned by the earth's rotation round its axis, and every point will have its way on the difc: the bignefs of the earth's difc is to be eftimated by the angle under which the earth is feen from the moon. See EARTH.

DISC, in botany, is an aggregate of florets forming, as it were, a plane furface.

DISC, in optics, is the width of the aperture of telefcopic glaffes, whatever their form be, whether plain, convex, concave, &c.

DISC, in the liturgy of the greek church, is nearly the fame with the patena in the latin church.

DISCERNING, or DISCERNMENT, among logicians, a faculty of the mind, whereby it diftinguifhes between the ideas. See JUDGMENT and INTUITION.

On this depends the evidence and certainty of feveral, even general, propofitions, which pafs for innate truths, that, in reality, proceed from this clear difcerning faculty of the mind, whereby it perceives two ideas to be the fame, or different. In being able nicely to diftinguifh one thing from another, confifts, in a great meafure, that exactnefs of judgment, and clearnefs of reafon, which is obfervable in one man above another. To the well diftinguifhing our ideas it chiefly contributes that they be clear and determinate; and when they are fo, it will not breed any confufion or miftake about them, though the fenfes fhould convey them from the fame object differently on different occafions.

DISCIPLE, one who learns any thing from another: thus, the followers of any teacher, philofopher, &c. are called difciples. In the chriftian fenfe they were followers of Jefus Chrift, in general; but in a more reftrained fenfe, the difciples denote thofe alone who were the immediate followers and attendants on his perfon, of which there were feventy or feventy-two. The names *difciple* and *apoftle* are often fynonymoufly ufed in the gofpel-hiftory, but fometimes the apoftles are diftinguifhed from difciples as perfons felected out of the number of difciples, to be the principal minifters of his religion; of thefe there were only twelve. The Latins kept the feftival of the feventy or feventy-two difciples on July 15, and the Greeks on January 4.

DISCIPLINE, in a general fenfe, denotes inftruction and government, as military difcipline, ecclefiaftical difcipline, &c. Ecclefiaftical difcipline confifts in putting thofe laws in execution by which the church is governed, and inflicting the penalties enjoined by them againft the feveral forts of offenders that profefs the religion of Jefus: the primitive church never pretended to exercife difcipline upon any but fuch as were within her pale, in the largeft fenfe, by fome act of their own profeffion; and even upon thefe fhe never pretended to exercife her difcipline fo far as to cancel or difannul their baptifm: all that fhe pretended to, was to deprive men of the benefits of external communion, fuch as public prayer, receiving the eucharift, and other acts of divine worfhip. The church difcipline was only confined to the admonition of the party, and to the leffer and greater excommunication.

As to the objects of ecclefiaftical difcipline, they were all fuch delinquents as fell into great and fcandalous crimes after baptifm.

Difcipline, in a more peculiar fenfe, is ufed for the chaftifements, or bodily punifhments inflicted, on a religious of the romifh church who has been found a delinquent; or, even for that which the religious voluntarily undergo or inflict on themfelves, by way of mortification.

DISCLAIMER, in law, is a plea wherein is contained an exprefs denial of a thing; as where upon the diftrefs of a lord, a tenant fhews a replevin, and the lord avows the taking, by alledging the tenant holds of him as of his lord, and that he diftrained for the rent unpaid, or fervice not performed: in this cafe, if the tenant denies that he holds of him, this is called a difclaimer; and on that account, if the lord proves the tenant to hold of him, the tenant, on a writ of right, fhall lofe his land. There is likewife a difclaimer o goods, as when a perfon arraigned of felony, difclaims the goods charged on him, though he fhould be acquitted, he lofes the goods. When a defendant in his anfwer in chancery, denies his having any intereft in the thing in queftion, it is alfo a difclaimer; and to thefe may be added a difclaimer or renouncing an executorfhip of a will, or the right to an adminiftration.

DISCONTINUANCE, in law, fignifies an interruption or ceffation of the courfe of a thing, and is of two kinds. 1. Difcontinuance of eftate or poffeffion, which has this effect, that a perfon may not enter upon his own land, &c. aliened, whatever his right be to it, of his own authority, but muft bring his writ, and feek to recover poffeffion by law. A difcontinuance may be by feoffment, fine, recovery, leafe, and confirmation with warranty; but grants of land without livery, or if made in fee without any warranty, are not difcontinuances. 2. Difcontinuance of procefs, where the opportunity to profecute a fuit is loft, or the plaintiff is put *fine die*, and difmiffed the court. After a verdict in a caufe, no difcontinuance is allowed without leave of the court, and cofts are ufually given the defendant on difcontinuing fuits. As difcontinuance of procefs is helped by appearance at common law, fo all difcontinuances and mifcontinuances of the plaintiff, or defendant, are cured after verdict by ftatute.

DISCONTINUANCE *of plea*, is when divers things fhould be pleaded to in a fuit or action, and fome thereof are omitted in the pleading. Where a defendant's plea anfwers to part only, it is a difcontinuance as to the part not anfwered, and the plaintiff may take judgment by *nil dicit* for that. But if the plaintiff pleads over thereto, the whole action is difcontinued.

DISCORD, in mufic, the relation of two founds which are always and of themfelves difagreeable, whether applied in fucceffion or confonance. Thus the fecond, fourth, and feventh, with their octaves, and, in general, all intervals, except thofe few which precifely terminate the concords, are called difcords. Difcords are diftinguifhed into concinnous and inconcinnous intervals. See the article INTERVAL.

Concinnous DISCORDS, called by the antients emmeli, are fuch as are fit for mufic, next to and in combination with concords. Thefe are relations which in themfelves are neither very agreeable nor difagreeable, and have only a good effect in mufic, as by their mixture and combination with the more natural and effential principles, they produce a variety neceffary to our being better pleafed.

Inconcinnous DISCORDS, by the antients called ecmeli, are fuch as are never chofen in mufic, as having too great a harfhnefs in them, though even the greateft difcord is not without its ufe. The effential principles of harmony, harmonical intervals, or concords, are in number only eight: the indefinite numbers of other ratios are all difcords. Hence Mr. Malcolm fhews the neceffity of taking fome of the lefs untoward of thefe difcords into the fyftem of mufic. In order to this, he confiders the effect of having none but harmonical intervals in the fyftem of mufic. 1. With refpect to a fingle voice. If that fhould move always from one degree to another, fo as every note or found to the next were in the ratio of fome concord, not only the variety, which is the life of mufic, would be foon exhaufted, but the very perfection of fuch relation of founds would clog the ear, in the fame manner as fweet and lufcious things do the tafte. 2. With refpect to mufic in parts, that is, where two or more voices join in confonance, the general rule is, that the fucceffive founds of each be fo ordered, that the feveral voices fhall be all concords. Now there ought to be a variety in the choice of thofe fucceffive concords, and alfo in the method of their fucceffion; all which depends on the movement of the fingle parts. So that if thefe could only move in an agreeable manner by harmonical diftances, there

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are but few different ways wherein they could move from concord to concord. and hereby we ſhould loſe much of the raviſhment of ſounds in conſonance. A variety, therefore, is requiſite, by which each ſingle voice, or more in conſonance, may move agreeably in the ſucceſſive ſounds, ſo as to paſs from concord to concord, and meet at every note in the ſame or a different concord, from what they ſtood in at the laſt note. From theſe two conſiderations, it appears how imperfect muſic would be without any other intervals than concords; but in what caſes, and for what reaſons diſcords are allowed, the rules of compoſition muſt teach. See HARMONY.

Beſides the concinnous diſcords uſed deſignedly in muſic, there are ſeveral other diſcord relations which happen unavoidably in an accidental and indirect manner. Thus in the ſucceſſion of ſeveral notes, there are to be conſidered not only the relations of thoſe which ſucceed others immediately, but alſo of thoſe, betwixt which others intervene. Now the immediate ſucceſſion may be conducted ſo as to produce melody; and yet among the diſtant notes there may be very groſs diſcords, that would not be tolerable in mediate ſucceſſion, and far leſs in conſonance. Thus taking any one ſpecies, for example, that with the greater third, and marking the degrees between each term and the next, though the progreſſion be melodious, as the terms refer to one common fundamental, yet there are ſeveral diſcords among the mutual relations of the terms, *e. g.* from the fourth to the ſeventh greater is 32 : 45, and from the ſecond greater to the ſix greater is 27 : 40, and from the ſecond greater to the fourth is 27 : 32, all diſcords.

Diſcords may tranſiently paſs upon the unaccented part of a meaſure, without great offence to the ear. This is called ſuppoſition. See SUPPOSITION.

The harmony of diſcords, is that wherein the diſcords are made uſe of as the ſolid and ſubſtantial part of the harmony. For by a proper interpoſition of a diſcord, the ſucceeding concords receive an additional grace. Thus the diſcords are in muſic, what ſtrong ſhades are in painting. See the article HARMONY.

The diſcords are the fifth when joined with the ſixth, the fourth with the fifth. The ninth of its own nature is a diſcord; ſo is the ſeventh. The diſcords are introduced into harmony with due preparations, and muſt be ſucceeded by concords, which is the reſolution of diſcords. The diſcord is prepared by ſubſtituting it firſt in the harmony, in quality of a concord; that is, the ſame note which becomes a diſcord, is firſt a concord to the baſe note immediately preceding that to which it is a diſcord. Again, a diſcord is reſolved by being immediately ſucceeded by a concord, deſcending from it only by the diſtance of a greater or leſſer ſecond.

DISCOVERY, in dramatic poetry, a manner of unravelling a plot, or fable, in tragedies, comedies, and romances, wherein, by ſome unforeſeen accident, a diſcovery is made of the name, fortune, quality, &c. of a principal perſon, which were before unknown. See CATASTROPHE.

A diſcovery ought never to be in vain, by leaving thoſe who remember one another in the ſame ſentiments they were in before: it muſt produce either love or hatred in the principal, not inferior characters.

Thoſe diſcoveries which are immediately followed by a change of fortune, are the moſt beautiful, as they never fail to produce terror or pity, which is the end and aim of tragedy. Thus, OEdipus in Sophocles, from his diſcovery of being the ſon of Jocaſta and Laius, immediately from the moſt happy becomes the moſt miſerable of mortals. See PERIPETIA.

There are ſeveral ſorts of diſcoveries: the firſt, by certain marks of the body, either natural or accidental, as that of Ulyſſes, who having received a wound in the thigh by a boar before the trojan war, is diſcovered by the old nurſe, upon waſhing his legs, after his return home incognito. The ſecond is by tokens, and is often uſed by Terence. The third is by remembrance. Thus when Ulyſſes heard Demodocus ſing his actions at Troy, the memory of them drew tears from his eyes, and diſcovered him to Alcinous. The fourth ſort is made by reaſoning; but the fineſt of all is that which ariſes from the ſubject or incidents of the fable; as that of OEdipus, from his exceſſive curioſity, and the letter that Iphigenia ſent by Pylades.

DISCOUNT, in commerce, a term among traders, merchants, aud bankers. It is uſed by the two former on occaſion of their buying commodities on the uſual time of credit, with a condition that the ſeller ſhall allow the buyer a certain diſcount at the rate of ſo much *per cent. per annum*, for the time for which the credit is

is generally given, upon condition that the buyer pays ready money for fuch commodities, inftead of taking the time of credit. Traders and merchants alfo frequently taking promiffory notes for monies due, payable to them or order at a certain time; and fometimes having occafion for money before the time is elapfed, procure thefe notes to be difcounted by bankers before the time of payment; which difcount is more or lefs according to the credit and reputation of the perfon who drew the note, and the indorfer or indorfers. Bills of exchange are alfo difcounted by bankers, and in this confifts one article of the profits of banking. See the article BANK.

The fieur de la Porte informs us, that they make a diftinction in France with regard to money due for the purchafe and fale of commodities, and on account of raifing money by difcounting bills of exchange; the latter being computed upon the principles of common intereft by fo much on the 100 l. whereas that on commodities is not only laid on the 100 l. but on the hundred and difcount added together.

The beft tables of difcount in our language, are thofe of Mr. Smart, founded upon the true principles of decimal arithmetic. By thefe it appears, that he who allows 5 l. for the difcount of 100 l. for one year at 5 l. *per cent.* wrongs himfelf; for he ought to receive fo much money as at 5 *per cent.* intereft will amount to 100 l. in one year, and the fum is 95 l. 4 s. 9 ½ d.

DISCOURSE, *difcurfus*, among logicians, fignifies the progreffive exercife of reafon in the fearch of truth; as when from felf-evident principles it difcovers the truth of fomething it did not know before; by means of this, a fecond; by that fecond, a third; and fo on. See the article REASONING.

DISCOUS FLOWERS, thofe furnifhed with a difc. See the article DISC.

DISCRETE, or DISJUNCT PROPORTION, is when the ratio of two or more pairs of numbers or quantities is the fame, but there is not the fame proportion between all the four numbers. Thus if the numbers 3 : 6 : : 8 : 16 be confidered, the ratio between 3 : 6, is the fame as that between 8 : 16, and therefore the numbers are proportional; but it is only difcretely or disjunctly, for 3 is not to 6 as 6 to 8; that is, the proportion is broken off between 8 and 3, and is not continued as in the following continual proportionals, 3 : 6 : : 12 : 24. See PROPORTION.

DISCRETE QUANTITY, fuch as is not continuous and joined together. Such is a number whofe parts being diftinct units, cannot be united into one continuum; for in a continuum, there are no actual determinate parts before divifion, but they are potentially infinite.

DISCRETIVE PROPOSITIONS, are thofe where various judgments are made and denoted by the particles *but*, *notwithftanding*, &c. either expreffed or underftood. Thus, *fortune may deprive me of my wealth, but not of my virtue*, is a difcretive propofition.

DISCUS, in antiquity, an inftrument ufed by the antients in their public games. It is certain it was ufed in the gymnaftic art for preferving health and ftrengthning the conftitution; but as to its form, its dimenfions, and various ufes, authors difagree. See the article DISC.

The fame exercife was performed with an inftrument called σόλος, which fome diftinguifh from the difcus, becaufe that was made of iron, and the difcus of ftone; while others diftinguifh them by the form, the σόλος being fpherical, and the difcus broad.

DISCUSSION, in matters of literature, fignifies the clear treating or handling of any particular point, or problem, fo as to fhake off the difficulties with which it is embarraffed: thus we fay, fuch a point was well difcuffed, when it was well treated of, and cleared up.

DISCUSSION, in a medicinal fenfe, the fame with diaphorefis. See DIAPHORESIS.

DISCUTIENTS, in medicine, are fuch remedies as, by their fubtilty, diffolve a ftagnating or coagulated fluid, and diffipate the fame without an external folution of continuity.

Difcutient compofitions confift of emollients and attenuants; in which intention mercury, cinnabar, opium, and camphor are greatly recommended. Difcutients ought to be carefully diftinguifhed from fuppuratives. See DISPERSION *of Inflammations*.

DISDIAPASON, or BISDIAPASON, in mufic, a compound concord, defcribed by F. Parran, in the quadruple ratio of 4 : 1, or 8 : 2.

The difdiapafon is produced when the voice goes diatonically from its firft to its fifteenth found, and may be called a fifteenth. The voice ordinarily does not go farther than from its firft found to the dif-

disdiapason; *i. e.* it does not go beyond the compound, or double octave; for the disdiapason is an octave doubled. The voice sometimes rises several degrees above the disdiapason, but the effort or struggle disfigures it, and makes it false. In reality, the antient scale or diagram extended only to a disdiapason.

DISDIAPASON-DIAPENTE, a concord in a sextuple ratio of 1 : 6.

DISDIAPASON-SEMI-DIAPENTE, a compound concord in the proportion of 16 : 3.

DISDIAPASON-DITONE, a compound consonance in the proportion of 10 : 2.

DISDIAPASON-SEMI-DITONE, a compound concord in the proportion of 24 : 5.

DISEASE, in medicine, the state of a living body, wherein it is deprived of the exercise of any of its functions, whether vital, natural, or animal.

Some authors have given us compendious theories of diseases: Bontekoe deduces all human diseases from the scorbutus: Musgrave, from the arthritis; Dr. Woodward, from the bile; some from the venereal virus, which has lurked in the seed ever since the sin of Adam; some from extraneous ferments, formed in or out of us; and some from worms.

As the actions or conditions of the body, so also the diseases or defects thereof may be reduced to three general heads, *viz.* those of the solids, those of the fluids, and those compounded of both.

The solids, *i. e.* the bones and flesh, may be disordered five ways, *viz.* rendered turgid by tumours, cut by wounds, corroded by ulcers, *&c.* removed out of their places, or discontinued by fractions and contusions.

Diseases of the fluids are in the blood or spirits. Those of the blood are two, such as thicken and retard its motion, or such as attenuate and accelerate it. To the last kind, the fever and feverish affections only belong: all other diseases of the blood belong to the former.

The diseases of the animal spirits arise either from an intermission or retardation of their motion; or a diminution of their quantity; or disorder in their quality.

Lastly, diseases of the fluids, whether those of the blood or spirits, are seldom long confined thereto, but presently come to disturb and impede some of the functions of the solid parts, and at last corrupt the substance of the solids themselves: hence arise compound or complicated diseases, which are infinitely various. The learned Boerhaave furnishes us with an accurate and scientifical division of diseases into those of the solids and fluids, to which we refer the reader.

All diseases are owing to the bad regulation of our lives, either from too much or too little sleep, too much or too little exercise, *&c.* Sometimes they are caused by things without, and very often by an abuse of food; that is, by our intemperance in eating and drinking, which is so much the more injurious to us, because it affects us inwardly. See REGIMEN.

Mr. Hacquet rejects the system of the materialists, who considered all diseases as *entia nova*, or new productions, and endeavours to account for all new modifications on a destruction of proportions, or a change in the structure of parts: he supposes the pressure, structure, and convulsion of the nerves affecting the fluids, to be the principal cause of distempers; and undertakes to prove, that the first operation of poisons and infections is on the spirits, and from them communicated to the blood.

To attain a complete history of diseases, such enquiries are to be made, and circumstances known, which show the genius and state of the disease; and the operations and effects of the medicines are to be carefully observed. A particular regard must be had to the symptoms which differ strangely in all different subjects, on account of the various constitutions of different bodies. It will therefore be necessary to enquire into the age, sex, structure, and habit of the body; or the acquired habit and strength of the patient; and whether he has an hereditary disposition to this or that disease. From the different constitution of the parts, arise the different state and mechanism of the solids and fluids, and a proneness to certain diseases; as also, the variety of manners and inclinations. In childhood, there is a remarkable softness of the fibres, a lax and thin habit, with an abundance of serum; young persons have tense and contractile fibres, with more hot blood, which is more apt for motion: those that are old have a great rigidity of the solids, and a straitness of the passages, vessels, and canals, with a salso-sulphureous dyscrasy of the humours. Likewise, regard must be had to the female sex, for they are not only obnoxious to distinct diseases, which arise from disorders of the menses and child-bearing, but the system of their nerves is likewise more weak: whence they are more liable

to

to spastic and convulsive disorders, and are more easily restored to health than men. See MENSES, PREGNANCY, &c.

It is likewise proper to know whether the patient be of a lax or tense habit of body, whether the vessels are slender and numerous, or large and few; because in narrow and slender canals, the progressive motion of the fluids is more difficult, as well as the secretions and excretions: for these are more quick and ready when the fibres are tense, and the vessels pretty large. Whence we may observe, that they are more liable to disorders, and grow well with greater difficulty, whose fibres are more strong, and whose circulation of the fluids is more quick. The same may be said of lean and fat persons. Regard must also be had to the colour of the face and skin. A fair, florid, and clear complexion, show the purity of the lymphatic fluids; if it be livid, lurid, and yellow, they discover a salino-sulphureous impurity of the same, and a disordered secretion in the proper organs, especially in the liver. It appears from daily observation, that the debility, defects, and faults of the viscera and fibres, as well as diseases proceeding from thence, often descend to children; and the practitioner should be informed hereof: for hereditary imbecilities and weaknesses are more difficult to be cured, more readily return, and tire the physician's patience. It is likewise necessary to know the strength; whether the patient's spirits are low, especially in the beginning of an acute disease, for weaknesses and lownesses are then bad signs: but if the person is in strength and vigour, which appear from the motion and impulse of the fluids, there are great hopes of recovering health.

We are not only to examine the condition of the body, but the state of the mind, and what disorders it is liable to, because there is a wonderful connection between the mind and the body. For a greater tensity and mobility of the fibres and solids, dispose the mind to anger; whereas a laxity and defect of the vis motrix, shows the person to be dispirited, timid, and fearful. On the other hand, anger increases the tone and contractions of the solids, and renders the fluids more impetuous; but timidity dissolves and dejects the strength, whence the circulation of the fluids is more slow. Terror greatly constringes the surface and extreme parts of the body, and drives the blood to the interior and noble parts; that is, the præcordia and head; whence proceed grievous disorders, especially of the genus nervosum. The same may be said of sadness, which often proceeds from a defect of the viscera, and a faulty circulation of the fluids, as in the hypochondriac passion: but when its hurtful influence attacks the solid parts, it wonderfully dejects the strength of the whole body, and hurts its functions, relaxing and lessening the strength of the fibres.

If the mind is not composed, and at ease, but subject to various passions and commotions, diseases are cured with greater difficulty; therefore, enquiry is to be made whether the patient is not addicted to hard study, and to profound and fatiguing meditation: for it can hardly be imagined what a consent there is between the brain and its membranes, as well as between the stomach and the adjoining intestines. See CONSENT *of parts.*

Besides, it is necessary to consider the place where the patient lives, the nature of the air, and his usual diet. See the articles AIR and DIET.

Enquiry must be made into the kind of life: whether it be laborious or unactive, requiring exercise or sedentary; whether the person be a courtier or a soldier; a student or a tradesman; whether he be conversant among metals and minerals, or work at the fire: for every kind of life produceth particular diseases: thus brasiers are subject to diseases of the eyes; husbandmen, to those of the breast; makers of starch, to coughs and asthmas; porters, to asthmas, ruptures, and bursting of the vessels in the breast; tallow-chandlers, to diseases of the head and stomach; workers in tow, hemp, and silk, to shortness of breath; leather-dressers are generally cachectic and hydropical; runners of races are often troubled with a shortness of breath, and spit blood; carpenters are subject to sore eyes; nightmen are apt to be blind; plasterers are subject to shortness of breath, and consumptions; washerwomen are liable to difficulties of breathing, and dropsies; makers of oil are cachectic and asthmatic; plumbers are subject to palsies; house-painters are generally valetudinarians, cachectic, and paralytic; fishermen have ulcers in their legs; bakers are subject to coughs, hoarseness, and lippitude, as well as a constipation of the pores; cutters of tobacco are subject to the vertigo; and the like.

Another thing to be examined is the ex-

cretions, for unless these are regular, health cannot be maintained; and therefore, if they are too plentiful, or defective and suppressed, they will cause various disorders. Regard is also to be had to perspiration, which carries off more matter than all emunctories besides. See EXCRETION and PERSPIRATION.

The practitioner should likewise enquire what diseases the patient has been subject to, at what time, and how cured; for it often happens in the rash and imprudent cure of diseases, that terrible and dangerous symptoms are produced, and that the driving away one disease, is productive of a much worse.

Sometimes diseases are strangely complicated, insomuch that if the patient was affected with the hypocondriac passion, or a cachexy, scurvy, debility of the head, spitting of blood, consumption, piles, gravel, or gout, another distemper supervenes, which requires the utmost prudence, and a different method of cure.

It is likewise necessary to inquire whether the patient is plethoric, or cacochymic; what is the state of the stomach, and intestines; what is the condition of the liver, whether the circulation through it be impeded; whether the bile be duly secreted; what is the state of the lungs; and, lastly, the temperies of the brain, and nervous system, are to be considered. These things being mutually consulted, we must proceed to the disease itself, as whether it be common, or epidemic; whether the virulence appears on the skin in pustles, or otherwise. As there is no fever or other disease which has not sensible remissions and intermissions of the symptoms, the physician ought to know the state of the natural, vital, and animal functions, as well in, as out of the paroxysm.

In acute diseases, we may know the genius and force of the disorder, from the respiration, nature, and condition of the pulse; besides, as no patient dies without an inflammation and internal mortification, and as the inflammation of the stomach and membranes are produced easily in acute diseases, and in the chronic the mortifications of the viscera put a period to human life, the physician should carefully attend to these fatal symptoms, in order to manage the disease with greater certainty.

Likewise, the state of the primæ viæ is carefully to be examined, as whether they are replete with sordes; whether the body is costive, or otherwise, &c. It is likewise necessary to observe the operations of the medicines, and what changes they produce, whether the force and vehemence of the symptoms mitigate or increase; or whether nothing of this kind happens. See MEDICINE.

Many diseases, and especially fevers of all kinds, attack the patient all at once, and are attended with particular symptoms, requiring sometimes one kind of management, and sometimes another: therefore, the causes of these diseases can be nothing else but such as are common to many men, and equally affect them all. The most common of which is the unhealthy state of the air: but this alone is not sufficient for the generation of epidemic diseases; for it is evident from observation, that, in the same climate, and the same constitution of the heavens, a disease shall infest the inhabitants of one place and not another, as appears from the small-pox, dysenteries, and miliary fevers: wherefore, recourse must be had to the nature of exhalations from pools and marshy places, which are replete with sulphureous, vitriolic, aluminous, bituminous, saline, and other particles. Regard must likewise be had to the different way of living, and kinds of aliments, from whence the causes of epidemic diseases differ in their nature, matter, texture, power, and virtue; and affect the structure and motion of the body in a preternatural manner: these causes and concurrent circumstances being known, an epidemic disease may be predicted, and the best method of cure advised.

The method of distinguishing the various kinds of diseases, is affixed to our account of these diseases, as they occur under their several names, and is therefore omitted here.

Endemic DISEASES. See the article ENDEMIC DISEASES.

Epidemic DISEASES. See the article EPIDEMIC DISEASES.

DISEASES *of infants*. See the article *Diseases of* INFANTS.

DISEASES *of plants*, generally proceed from aqueous, bituminous, or saline parts. Sometimes the disease is essential, proceeding from some secret imperfection in the seed; sometimes only accidental by some outward violence. The several seasons of the year are the causes of injurious accidents to trees; the winter by extraordinary colds; the spring by piercing mists, rawness of the air, and hurtful

ful dews; the fummer by too great droughts and exceffive heat; and the autumn by too great a degree of moifture. Difeafes may alfo happen to the feed, before it is put into the earth. Mr. Tournefort has an exprefs differtation on this fubject in the *Memoires de l'Academie des Sciences*, referring all the difeafes of plants, 1. Either to too great abundance of nutritious juice. 2. The want or defect of this juice. 3. Some ill qualities it acquires. 4. Its unequal diftribution in difficult parts of the plants, or, 5. external accidents.

The moft common difeafes belonging to trees are barrennefs, blafting of the buds, confumption, mofs, jaundice, mildew, caufed by a thick fog, falling of the leaves, fcorching, the worm, not thriving, *&c.*

DISEMBOGUE, in the fea-language, is faid of a fhip that paffes out of a gulph or bay into the open fea: a river is alfo faid to difembogue or difcharge itfelf into the fea.

DISFRANCHISING, among civilians, fignifies the depriving a perfon of the rights and privileges of a free citizen or fubject. See the article FRANCHISE.

DISGUISE, a counterfeit habit. Perfons doing unlawful acts in difguife, are by our ftatutes fometimes fubjected to great penalties, and even declared felons. Thus by an act, commonly called the black act, perfons appearing difguifed and armed in a foreft, or grounds inclofed, or hunting deer, or robbing a warren or a fifh-pond, are declared felons.

DISH, among miners, denotes a wooden meafure, wherein they are obliged to meafure their ore: it is kept by the barmafter, and contains about 672 folid inches. See the article ORE.

DISJUNCT PROPORTION, the fame with that otherwife called difcrete. See the article DISCRETE.

DISJUNCTIVE, fomething that feparates or disjoins. Thus, *or*, *neither*, &c. which in connecting a difcourfe yet feparates the parts of it, are called disjunctive conjunctions.

DISJUNCTIVE PROPOSITION, in logic, is that where of feveral predicates we affirm one neceffarily to belong to the fubject to the exclufion of all the reft, but leave that particular one undetermined. Such is the major of the following disjunctive fyllogifm.

The world is either felf-exiftent, or the work of fome finite, or of fome infinite being.

But it is not felf-exiftent, nor the work of a finite being.

Therefore it is the work of an infinite being.

DISK, or DISC. See the article DISC.

DISLOCATION, in furgery, the fame with luxation. See LUXATION.

DISMEMBERED, in heraldry, is applied to birds that have neither feet nor legs, and alfo to lions and other animals whofe members are feparated.

DISMOUNTING, in the military art, the act of unhorfing. Thus to difmount the cavalry, dragoons, *&c.* is to make them alight.

Difmounting cannon, is the breaking their carriages, wheels, axletrees, or any thing elfe, fo as to render them unfit for fervice.

DISORIENTATED, a term chiefly ufed in fpeaking of dials, which have been fome how altered from the fituation of directly facing the eaft or any other of the cardinal points. See the articles DIAL and DIALLING.

DISPARAGEMENT, in our law, is properly ufed for the matching an heir in marriage under his degree, or againft decency.

DISPART, in gunnery, is the fetting a mark upon the muzzle ring, or thereabouts, of a piece of ordnance, fo that a fight-line taken upon the top of the bafe-ring againft the touch-hole, by the mark fet on or near the muzzle, may be parallel to the axis of the concave cylinder. The common way of doing this, is to take the two diameters of the bafe-ring, and of the place where the difpart is to ftand, and divide the difference between them into two equal parts, one of which will be the length of the difpart which is fet on the gun with wax or pitch, or faftened there with a piece of twine or marlin. By means of an inftrument it may be done with all poffible nicety.

DISPATCH, a letter fent abroad by a courier on fome affair of ftate, or other matter of importance. The bufinefs of difpatches lies upon the minifters of ftate and their clerks.

This word alfo fignifies the packet or mail containing fuch letters.

DISPAUPER. A perfon fuing in forma pauperis, is faid to be difpaupered if, before the fuit is ended, he has any lands or other eftate fallen to him, or if he does any thing to make him lofe his privilege. See the article FORMA PAUPERIS.

DISPEN-

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DISPENSARY, or DISPENSATORY, denotes a book containing the method of preparing the various kinds of medicines ufed in pharmacy. Such are thofe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Mefue, Salmon, Lemery, Quincy, *&c.* but the lateft and moft efteemed are the Edinburgh and London Difpenfatories. In compiling this laft, the chief care of the college of phyficians was to expunge the medicines no longer made ufe of in general practice, and to infert fuch as have come lately into efteem; and alfo to examine the articles they have retained or given admiffion to, both in regard to their pharmaceutic compofition, and upon the genuine principles of medicine. The apothecaries in and about London are obliged to make up their compound medicines according to the formulas prefcribed in the college difpenfary, and are enjoined to keep always ready in their fhops all the medicines there enumerated.

DISPENSARY, or DISPENSATORY, is likewife a magazine or office for felling medicines at prime coft to the poor. The college of phyficians maintain three of thefe in London, one at the college itfelf in Warwick lane; another in St. Peter's alley, Cornhill; and a third in St. Martin's-lane.

DISPENSATION, in law, the granting a licence of doing fome certain action that otherwife is not permitted.

The greateft dealer in difpenfations is the pope, who claims the office *jure divino*, and extends it to every thing. The more moderate of the romanifts themfelves deny that he can give a difpenfation for any thing contrary to the divine law, or the law of nature; and confine him to what is contrary to pofitive laws, or to things relating to fafts, marriages, holding feveral benefices, *&c.* and they limit him even in thefe things.

The archbifhop of Canterbury has a power, by ftatute, of difpenfing in any caufe wherein difpenfations were formerly granted by the fee of Rome; and as well to the king as his fubjects; and during the vacancy of the archbifhop's fee, the guardian of the fpiritualities may grant difpenfations. Every bifhop of common right has the power of inftituting into benefices, and of difpenfing in common cafes, *&c.* A difpenfation of the king, makes a thing prohibited lawful to be done by the perfon that has it, though a thing evil in itfelf will not admit of a difpenfation. And where the fubject has an immediate intereft in an act of parliament, the king cannot difpenfe with it; but may, if the fuit be the king's own only, for the breach of a penal law that is not to the damage of a third perfon.

There is a difpenfation by *non obftante*, which is where a ftatute tends to reftrain fome prerogative incident to the perfon of the king, as the right of pardoning, or commanding the fervice of the fubjects for the benefit of the public, *&c.* each of which prerogatives are infeparable from the king, and therefore, by a claufe *non obftante*, fuch a ftatute may be difpenfed with. See the article NON OBSTANTE.

DISPENSATORY, or DISPENSARY. See the article DISPENSARY.

DISPERSION, in optics, the fame with the divergency of the rays of light.

Point of DISPERSION, in dioptrics, the point from which refracted rays begin to diverge, where their refraction renders them divergent. See REFRACTION.

DISPERSION *of Inflammations*, in medicine and furgery, is the removing the inflammation, and reftoring the inflamed part to its natural ftate.

Though the methods ufed to cure inflammations be various, according to the feveral caufes and fupervening fymptoms, with other various circumftances, yet as the inflammation conftantly arifes from an infpiffation of the blood in its fmalleft veffels, the grand intention of each of thefe methods fhould be, to open fuch fmall veffels as are thus obftructed, and to reftore the blood to its natural confiftence and free circulation.

If the caufe of the inflammation is found to be external, and obvious to the fenfes, as thorns, fplinters, the point of a fword, bullets, or any other foreign body ftuck into the part, nothing can be more ferviceable than fpeedily and carefully to remove whatever is lodged there, if it can be done with fafety. So alfo, when the inflammation proceeds from too ftrait a bandage in wounds, *&c.* or from a luxation or fracture, the firft and principal bufinefs is fpeedily to remove the bandage, or elfe fet the fracture, or reduce the luxation.

When the external caufes are once removed, and when the inflammation is great, and proceeds from internal caufes, it is in both cafes very ufeful to open a vein, either in the arm or foot, and to draw off a large quantity of blood proportionable to the ftrength and habit of the

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the patient; giving afterwards a brifk purge, not one that heats the body, but judicioufly accommodated to the age and conftitution of the patient; and if the fymptoms do not remit and grow milder, they muft be repeated at difcretion.

To refolve and attenuate the infpiffated blood in the fmall veffels, benefit may arife from internal medicines, which are watry, diluent, cooling, and attenuating; but aliments which are of a difficult digeftion, fuch as pickled or falted meats, with all fpices and fermented liquors, or any thing elfe that may heat the blood, are to be altogether avoided. With regard to the regimen and diet, the moft proper aliment feems to be broths and drinks, made with barley, oats, or flour; alfo viper's grafs, fuccory, chervil, forrel, endive, apples, and vegetables of the like nature.

With regard to external medicines, it muft be generally obferved never to apply hot remedies to hot conftitutions, nor the contrary. Among the domeftic medicines cow's dung, frefh and warm, mixt with warm vinegar, is an application of no fmall efficacy: the external medicines fhould always be applied hot, and the difordered limb firft well rubbed with a cloth dipped in fome warm difcutient fomentation, before any frefh cataplafm be laid on. Of the cooling external medicines proper in this cafe, are the litharge vinegar, applied warm on linen rags folded together; or hot vinegar mixt with red-lead, or with bole-armoniac, and applied in the fame manner. Among the hot remedies for cold conftitutions, are fpirit of wine alone, or camphorated fpirit; or either of thefe, with an admixture of a fmall quantity of venice-treacle applied on a linen cloth; alfo fpirit of wine mixed with lime-water, or even lime-water alone; or hungary-water with lapis calaminaris, cerus, fal armoniac; or a mixture of a pint of rectified fpirit of wine with two ounces of caftile foap.

DISPLAYED, in heraldry, is underftood of the pofition of an eagle, or any other bird, when it is erect, with its wings expanded or fpread forth. See plate LXXIII. fig. 5.

DISPONDEE, *difpondæus*, in the greek and latin poetry, a double fpondee or foot, confifting of four long fylables, as ἑὐμ-ζοῖων, māēcēnātēs, cōnclūdēntēs.

DISPOSITION, in architecture, the juft placing the feveral parts of an edifice, according to their proper nature and office. See the article BUILDING.

DISPOSITION, in rhetoric, the placing words in fuch an order as contributes moft to the beauty and fometimes even to the ftrength of a difcourfe.

Nature formed man with a tafte which makes him fenfible of harmony and cadence; for this we need only confult nature, ftudy the genius of the language and found, and, as it were, interrogate our ears: for let a thought be ever fo beautiful in itfelf, if the words which exprefs it are ill placed, the delicacy of the ear is fhocked at it; a harfh and unharmonious compofition grates it, whereas it is generally flattered with that which is foft and flowing. There are no expreffions, however harfh they may appear in themfelves, but may contribute to the harmony of a difcourfe, when judicioufly ranged. Ifocrates was the firft among the Greeks that made them fenfible of the beauty of difpofition, as Cicero did the Romans.

DISPROPORTION, a general term for any kind of irregularity, or want of proportion in the parts of a thing. See the article PROPORTION.

DISPUTATION, in the fchools, a conteft, either by word or writing, on fome point of learning for a degree, prize, or for an exercife. See DEGREE and THESIS.

DISQUISITION, a ferious and exact examination into the circumftances of any affair, in order to difcourfe clearly about it. See the article REASONING.

DISS, a market-town of Norfolk, on the river Waveney, fixteen miles fouth of Norwich.

DISSECTION, in anatomy, the cutting up a body, with a view of examining the ftructure and ufe of the parts. See the article ANATOMY.

Le Gendre obferves, that the diffection of a human body, even dead, was held a facrilege till the time of Francis I. and the fame author affures us, he has feen a confultation held by the divines of Salamanca, at the requeft of Charles V. to fettle the queftion whether or no it were lawful in point of confcience to diffect a human body in order to learn the ftructure thereof.

It is eafily perceived that furgery and phyfic muft improve in a country, according to the opportunities of enquiring into the ftructure of the animal oeconomy; for which reafon we could wifh that ftudents in anatomy were furnifhed with fubjects

subjects for diffection in this country, in as great abundance, and with as little inconvenience, as in France.

DISSEISIN, in law, an unlawful difpoffeffing a perfon of his lands or tenements. It is of two forts, either fingle diffeifin, which is committed without force of arms, or diffeifin by force of arms, more properly termed deforcement. See the article DEFORCEMENT.

The difturbing a perfon from entring on his land, or hindring him from tilling it, are both diffeifins of land; and denial of rent, when lawfully demanded, is a diffeifin of the rent.

If a diffeifor, after he has expelled the right owner, gains peaceable poffeffion of the lands five years without claim, and continues in poffeffion fo as to die feifed, and the land defcends to his heirs, they will have a right to the poffeffion till the owner recovers at law; and here the owner fhall lofe his eftate for ever, if he do not profecute his fuit within the time limited by the ftatute of limitations.

DISSEISOR, a perfon who is guilty of diffeifin. See the preceding article.

DISSENTERS, feparatifts from the fervice and worfhip of the church of England.

At the revolution a law was enacted, that the ftatutes of queen Elizabeth and king James I. concerning the difcipline of the church, fhould not extend to the proteftant diffenters. Perfons diffenting, however, are to fubfcribe the declaration of 30 Car. II. cap. 1. and take the oaths of fidelity, *&c.* Befides, they are not to hold their meetings till their place of worfhip is certified to the bifhop, or to the juftices of the quarter feffions, and regiftered. Alfo they are not to keep the doors of their meeting-houfes locked during the time of divine fervice. And to fecure to them the free exercife of their religion, whoever difturbs or molefts them in the performance of divine worfhip, on conviction at the feffions is to forfeit twenty pounds by the ftatute 1 William and Mary. Unlefs diffenters conform and receive the facrament as adminiftered by the church of England, they are excluded from holding any public places under the government.

The diffenters tolerated by law, may be reduced to four claffes, *viz.* prefbyterians, independants, anabaptifts, and quakers; to which may be added another fect, which fome years ago obtained a toleration in this country, namely, the unitas fratrum, or moravians. See the articles PRESBYTERIANS, ANABAPTISTS, *&c.*

DISSIMULAR, in general, an appellation given to things which are unlike: thus the feminal or firft leaves of plants, are called diffimular, as being generally of a different figure from thofe of the grown plants.

DISSIMULAR PARTS, in anatomy, thofe compounded of parts of various ftructure, fuch are all the limbs of the body.

DISSIMILITUDE, in general, denotes whatever conftitutes the difference between two diffimular things. See the articles DISSIMULAR and SIMILITUDE.

DISSIMILITUDE, in rhetoric, an argument wherein from diffimilar or unlike things, other diffimilars are deduced, as in the following argument from Catullus.

Soles occidere & redire poffunt.
Nobis cum femel occidit brevis lux,
Nox eft perpetua una dormienda.
Voff. de inftitut. orator.

DISSIPATION, in phyfics, an infenfible lofs or confumption of the minute parts of the body; or, that flux whereby they fly off, and are loft. See EFFLUVIUM.

Circle of DISSIPATION, in optics, is ufed for that circular fpace upon the retina, which is taken up by one of the extreme pencils or rays iffuing from an object.

To underftand this, it is to be obferved, that when the diftance of an object from the eye is too fmall or too great for perfect or diftinct vifion, the rays of each pencil, iffuing from the object, cannot be united at a point on the retina, but beyond it, or before they arrive at the retina; confequently, the rays of each pencil will occupy a circular fpace upon the retina, and this circle is called the circle of diffipation, becaufe the rays of a pencil, inftead of being collected into a central point, are diffipated all over this circle.

The confideration of the circles of diffipation, formed by the rays coming from the extremities of objects, is of ufe to account for feveral curious phænomena of vifion.

DISSOLVENT, in general, whatever diffolves or reduces a folid body into fuch minute parts as to be fuftained in a fluid.

The principal diffolvents for metals, are aqua-regia and aqua-fortis; for falts, earths, and gums, water; for coral, and other alkaline fubftances, diftilled vinegar or fpirits of wine. See the article AQUA-REGIA, *&c.*

Diſſolvents are the ſame with what the chemiſts call menſtruums. See the article MENSTRUUM.

Univerſal DISSOLVENT. See the article ALKAHEST.

DISSOLUTION, in chemiſtry, the ſame with ſolution. See the articles SOLUTION and MENSTRUUM.

DISSOLUTION, in muſic, is when a ſound in the enharmonic genus is lowered three dieſes; for thereby that genus is diſſolved, and the muſic, or that interval at leaſt is chromatic.

DISSONANCE, in muſic, the ſame with diſcord. See the article DISCORD.

DISSYLLABLE, among grammarians, a word conſiſting only of two ſyllables: ſuch are nature, ſcience, *&c.*

DISTAFF, an inſtrument about which flax is tied in order to be ſpun.

DISTANCE, in general, an interval between two things, either with regard to time or place.

Dr. Berkley, in his eſſay on viſion, maintains that diſtance cannot of itſelf and immediately be ſeen, for diſtance being a line directed endwiſe to the eye, it projects only one point in the fund of the eye, which point remains invariably the ſame, whether the diſtance be longer or ſhorter. But Mr. Mac-Laurin obſerves, that the diſtance here ſpoken of, is diſtance from the eye; and that what is ſaid of it muſt not be applied to diſtance in general. The apparent diſtance of two ſtars is capable of the ſame variations as any other quantity or magnitude. Viſible magnitudes conſiſt of parts into which they may be reſolved as well as tangible magnitudes, and the proportions of the former may be aſſigned as well as thoſe of the latter; ſo that it is going too far to tell us, that viſible magnitudes are no more to be accounted the object of geometry than words; and that the ideas of ſpace, outneſs, and things placed at a diſtance, are not, ſtrictly ſpeaking, the object of ſight; and are not otherwiſe perceived by the eye than by the ear.

Acceſſible DISTANCES, in geometry, are ſuch as may be meaſured by the chain, *&c.* See CHAIN, THEODOLITE, *&c.*

Inacceſſible DISTANCES, are ſuch as cannot be meaſured by the chain, *&c.* by reaſon of ſome river, or the like, which obſtructs our paſſing from one object to another.

Inacceſſible diſtances may be meaſured in the following manner: ſuppoſe it were required to meaſure the diſtance between the ſtation A (plate LXXIII. fig. 6. n° 1.) and the object at C. Aſſume another ſtation as B, from whence the object may be ſeen. Then, with any proper inſtrument, take the angles C A B, and C B A, and meaſure the diſtance A B. Then, in the triangle A B C, are given three angles, and the diſtance A B, whence the diſtance A C required may be eaſily found thus: as the ſine of the angle C : the diſtance A B : : the ſine of the angle B : A C required.

But ſmall inacceſſible diſtances may be meaſured from one ſtation, in the following manner. Let A B (*ibid.* n° 2.) repreſent an inacceſſible diſtance to be meaſured; ſet up perpendicular a ſtick C A, of a known length, place the center of your quadrant C, on the top of the ſtick; and look through the ſights of it till the viſual ray points to the object at B. Then in the right angled triangle B A C, are given the perpendicular A C, and the angle A C B, and therefore, if A C be ſuppoſed the radius, the required ſide will be the tangent to the given angle A C B; whence to find A B it will be as the radius to A C, ſo is the tangent of the angle A C B, to A B required.

DISTANCE, in navigation, the number of minutes or leagues a ſhip has ſailed from any given place or point.

DISTANCE, in aſtronomy. The diſtance of the ſun, planets, and comets, is only found from their parallax, as it cannot be found either by eclipſes or their different phaſes: for from the theory of the motions of the earth and planets we know, at any time, the proportion of the diſtances of the ſun and planets from us; and the horizontal parallaxes are in a reciprocal proportion to theſe diſtances, See the article PARALLAX.

The mean diſtances of the planets from the ſun, in britiſh miles, have been uſually determined by aſtronomers, as follow.

Mercury	32,000,000	miles diſtant from the ſun.
Venus	59,000,000	
The Earth	81,000,000	
Mars	123,000,000	
Jupiter	424,000,000	
Saturn	777,000,000	

Theſe are the mean diſtances of the planets from the ſun, as determined by the various methods formerly uſed for finding the quantity of the ſun's parallax: but aſtronomers have been directed to a method of determining that parallax with much

much greater nicety, *viz.* to within the 308thpart of thewhole, which is furprizingly near the truth, in comparifon of the former methods, which could never come nearer than a tenth or a twelfth part, at moft. Dr. Halley, in the year 1677, being in the ifland of St. Helena, obferving the fouthern fixed ftars, had the pleafure of feeing mercury tranfit the difc of the fun; and obferved, that the duration of thefe tranfits could be found to the exactnefs of one fecond of time. This cafual obfervation infpired him with the thought that the parallax of the fun, and confequently his diftance from the earth, might be found by proper obfervations on a tranfit of Venus over his difc. Accordingly, he prefented a paper to the Royal Society, containing the method of finding the fun's parallax, and confequently his diftance from the earth, by proper obfervations on a tranfit of Venus, which was to happen on the 6th of June, 1761. See *Philofoph. Tranfact.* n° 348. But from obfervations fince made on the planet Venus, it appears, that the tables ufed by Dr. Halley were not fufficiently accurate, having not then made his own tables; and alfo, that, by an overfight, that great aftronomer fubtracted one angle from another, when he fhould have added them together, confequently his calculation is erroneous.

Tho' the obfervations made of this famous tranfit, by aftronomers fent from different ftates in Europe to various parts of the earth for that purpofe, have not yet been publifhed; nor calculations made in confequence of a comparative view of fuch obfervations, we may venture to affirm that the dimenfions of the folar fyftem are much greater than they have been hitherto computed, and that, in confequence of the obfervations made on the tranfit of Venus on the 6th of June 1761, the diftance of the fun from the earth will be found little fhort of 120,000,000 of miles, and its diftance from the other planets in proportion. See the articles PLANET, SUN, VENUS, and TRANSIT.

It is proper to obferve, that on account of the very ftrict laws, by which the motions of the planets are regulated, Venus is feldom feen within the fun's difc; and during the courfe of more than an hundred and twenty years, it could not be feen once, that is, from the year 1639 (when this pleafing phænomenon was obferved by that excellent youth Horrox, our countryman, but by none before him fince the beginning of the world) to the year 1761. There will, however, be another tranfit of Venus, on the 3d of June 1769, which will afford ftill a much better opportunity for finding the fun's parallax, by almoft the greateft difference in the duration of thefe eclipfes that can poffibly happen; and will, if properly obferved, at Torne in Lapland, and the iflands of Solomon in the fouth fea, afford as fine an opportunity of finding the fun's parallax as can be wifhed.

The diftance of the fixed ftars, as having no fenfible parallax, can be little more than gueffed at.

The diftances of the fecondary planets, from their refpective primary ones, are as follow.

The moon is diftant from the earth 60 femi-diameters and a half of the earth, from its center, or 240,000 miles.

The firft moon of jupiter is at the diftance of $5\frac{6}{10}$ femi diameters of jupiter's body from his center, as meafured with a micrometer.

The fecond at the diftance of nine femi-diameters.

The third at the diftance of $14\frac{3}{10}$ femi-diameters.

The fourth at the diftance of $25\frac{3}{10}$ femi-diameters.

The firft faturnian moon is at the diftance of near 2 femidiameters of faturn's ring from its center.

The fecond at the diftance of $2\frac{2}{5}$ femi-diameters of the ring.

The third at the diftance of $3\frac{2}{3}$ femi-diameters.

The fourth at the diftance of 8 femi-diameters.

The fifth at the diftance of $23\frac{3}{16}$ femi-diameters. See DIAMETER.

Curtate DISTANCE, the diftance of a planet's place, reduced to the ecliptic, from the fun. See the article CURTATE.

DISTANCE *of the eye*, in perfpective, is a line drawn from the eye to the principal point. See PERSPECTIVE.

DISTANCE *of the baftions*, in fortification, is the fide of the exterior polygon. See the article POLYGON.

DISTASTE properly fignifies an averfion or diflike to certain foods, and may be either conftitutional, or owing to fome diforder of the ftomach; in which laft cafe emetics are recommended.

DISTEMPER, among phyficians, the fame with difeafe. See the article DISEASE.

DISTEMPER, in painting, a term ufed for the working up of colours with fomething befides water or oil. If the colours are prepared with water, that kind of painting is called limning; and if with oil, it is called painting in oil, and fimply painting. If the colours are mixed with fize, whites of eggs, or any fuch proper glutinous, or unctuous matter, and not with oil, then they fay it is done in diftemper. In this manner the admirable cartoons at Hampton-court are painted. The greateft difadvantage of diftemper is, that it has no glittering, and all its colours look dead, by which means they appear alike in all forts of lights, which oil colours, or even colours in diftemper, when varnifhed, do not.

DISTEMPER, or DISTEMPERATURE *of plants*. See the article DISEASES *of plants*.

DISTENSION, in general, fignifies the ftretching or extending a thing to its full length or breadth.

DISTENSION, *diftenfio*, among antient muficians, is ufed in a fynonymous fenfe with interval. See INTERVAL.

DISTICH, διστιχον, a couplet of verfes making a complete fenfe. Thus hexameter and pentameter verfes are difpofed in diftichs.

There are excellent morals in Cato's Diftichs.

DISTICHIASIS, in furgery, a difeafe of the eye-lids, when under the ordinary eye-lafhes there grows another extraordinary row of hair, which frequently eradicates the former, and pricking the membrane of the eye, excites pain, and brings on a defluxion.

It is cured by pulling out the fecond row of hairs with nippers, and cauterizing the pores out of which they iffued.

DISTILLATION, in chemiftry, the act of drawing off the fpirituous, aqueous, oleaginous or faline parts of a mixed body from the groffer and more terreftrial parts by means of fire, and collecting and condenfing them again by cold. The end of diftillation is of two kinds: the firft, and by far the moft general, is for the feparation of fome acquired bodies, from others with which they were mixed, as in the cafe of vinous and volatile fpirits, and effential oils: the other is for the quicker and more effectual combination of fuch bodies, whofe mixture is affifted by a boiling heat, as in the cafe of fpir. nitr. dulc.

Diftillation is performed by feveral kinds of apparatus, for all which the general name is an alembic; to form each kind whereof, two or more veffels are conjoined, *viz.* a proper refervoir to contain the matter while the heat acts upon it, a refrigerant to condenfe the vapour as it rifes; and a receiver to contain it when condenfed. See the article ALEMBIC, RETORT, and RECEIVER.

Diftillation is ufually performed by means of fire, raifed to a greater or lefs degree of heat, as circumftances require. And the fire is either applied immediately to the veffels in which the matters are to be diftilled; or it is applied mediately by means of water, fand, iron-filings, &c. Hence thefe different methods are called balneum mariæ, balneum arenorum, &c. See the article BALNEUM.

Diftillation is either *per afcenfum*, by afcent, or *per defcenfum*, by defcent. In the former, the matter to be diftilled is above the fire, and the fpirit or other principle is raifed from it. In the latter, the matter to be diftilled is below the fire, and the vapour drawn from it is precipitated to the bottom of the veffel.

Diftillation by afcent is either right, performed with a common alembic, wherein the liquor is raifed perpendicularly, and defcends again in form of drops into a receiver, being chiefly ufed when the texture of the body allows of an eafy afcent, as in vegetables; or oblique, performed laterally, as in diftillation by the retort; the ufe of this is for bodies, as almoft all minerals and metals, which cannot be raifed without a ftrong impulfe, nor even by the ftrongeft, fo high as the top of the alembic.

The procefs and meafures of diftillation are very different, according to the different fubjects to be diftilled. Acid fpirits are ufually drawn in a reverbatory furnace, and with a vehement fire: ponderous woods, as guaiacum, box, &c. are diftilled in a retort after the fame manner. Odoriferous plants, as baum, wormwood, fage, hyffop, &c. are diftilled by the cucurbit, or vefica, firft pouring a ftrong decoction of the fame plant hot upon the plant itfelf bruifed, or adding common water to the plant, whether dry or frefh, cut into fmall pieces, and letting the whole digeft in a clofe veffel for two days. In diftilling plants that are not odoriferous, pound the plant, and then fill two thirds of the vefica or alembic with it; after which pour a good quantity of the expreffed juice of the fame plant

upon it, ſo as the bruiſed matter may float therein, without ſticking any where to the veſſel; then draw off about half as much water as there was juice, which is the diſtilled water of the plant: if what remains be preſſed in a cloth, and the ſettled juice be filtrated and evaporated to two thirds, then ſetting it in a cool place, the eſſential ſalt ſhoots into cryſtals.

The precautions to be uſed in regard to diſtillation, are, 1. To leave ſufficient room in the containing veſſel for the expanſion and ebullition of the matter to be diſtilled, otherwiſe it is very apt to overflow in the neck, and break the veſſels if of glaſs, hazard the firing of the building in caſe of vinous ſpirits, and fruſtrate the operation in all. 2. To take care that the condenſing ſurface be ſufficiently large, and the heat accomodated to it; for if an error of this kind occur in the caſe of the worm-ſtill, the head will be blown off, and the vapour diſſipated with conſiderable loſs; and in that of vinous ſpirits, whoever may happen to be in the place will be in very great danger. 3. It is neceſſary in diſtillation, as well as in digeſtion, to avoid luting the veſſels too cloſely with any tenacious ſubſtance; for if a ſufficient vent be not left for the eſcape of the air which is generated during the diſtillation of ſome ſubſtances, as alſo for the expanſion which attends the increaſe of heat of that air which is included in the veſſels at the time of their junction, the veſſels will be in extreme danger of being burſt with great violence.

The method of diſtilling malt-waſh, or a fermented mixture of meal and malt, for ſpirit. Fill two thirds of a ſtill, firſt moiſtened by the ſteam of boiling water, with malt-waſh, immediately clap on the head, and lute it down, there will ſoon run a ſpirituous inflammable liquor. Thus is obtained what the malt-diſtillers call a malt low-wine; what comes over after the ſpirit falls off from being proof, is called faints. This experiment may be rendered general, with ſlight variation; for if any wine, beer, or fermented liquor from ſugar, treacle, or fruits, &c. be thus treated, it affords a ſpirit differing only according to the nature of the ſubject: but none of them will afford the leaſt inflammable ſpirit without a previous fermentation. The requiſite cautions for ſucceſs, are, 1. That the fermentation be well performed. 2. That it be gently diſtilled, with a ſoft well regulated fire. 3. That the groſſer oil, apt to riſe along with the ſpirit, be let out by flannel under the noſe of the worm. Theſe cautions obſerved, the low-wines will be pure and vinous.

The method of diſtilling the lower wines into proof ſpirits for ſale. The lower wines of the laſt proceſs, diſtilled in a bath-heat, give a higher rectified ſpirit than before, which being let down with fair water to a certain ſize or ſtandard, called proof, is what the malt-diſtillers underſtand by proof-goods, or their rectified malt-ſpirit.

The inconveniences of this art, on account of the many large veſſels required, which increaſe the labour and price of the commodity, might perhaps be remedied by the introduction of a new art, ſubſervient to the malt-diſtillers, and confined to the boiling down the malt-wort to a rob; wherefore it were to be wiſhed that thoſe who were ſkilled in this branch of diſtillation would try whether a ſpirit ſuperior to that of treacle may not be procured from the rob of malt, prudently prepared and fermented. See the article RECTIFICATION.

Combinatory DISTILLATION, a term uſed by Dr. Shaw, to expreſs that ſort of rectification of diſtilled ſpirits, which is done with additions, and which he otherwiſe calls *improper rectification*, by way of diſtinction from that called proper rectification, which is only the method of reducing a ſpirit to its utmoſt degree of purity and perfection. Malt-ſpirit is the general ſubject of combinatory diſtillation, and the means to rectify it on this plan may be reduced to three heads: 1. That by fixed alkaline ſalts alone. 2. That by fixed alkaline ſalts and acid ſpirits. And, 3. That by ſaline bodies and flavouring additions. The effect of this operation, when carefully performed, is to attenuate and thin the ſpirit, and to keep back a part of its groſs and fetid oil, and ſo far to alter the part of the oil which comes over, as ſcarce to leave the ſpirit diſtinguiſhable from a malt ſpirit.

The ſalts uſed on this occaſion are either the fixed alkalies, as potaſh and calcined tartar, or decrepitated common ſalt, or calcined vitriol, alum, or ſandiver. The moſt common flavourers are mace, orrice-roots, parſnips, artichoaks, rhodium, raiſin-ſtalks, damaſk roſes, wine lees, rape or grape huſks, and the oil of wine, which is infinitely preferable to all the others, but is not ſo well known. The ultimate perfection aimed at in all the proceſſes of combinatory diſtillation, is the depurating the engliſh malt-ſpirit at one operation,

tion, ſo as to render it taſteleſs and inodorous and yet vinous; or elſe to make it reſemble the french brandy, arrack, or ſome other low-flavoured vinous ſpirits.

DISTILLED, ſomething that has undergone the action of diſtillation: thus we ſay diſtilled water, diſtilled vinegar, *&c.* See the preceding article.

DISTILLER, he who makes diſtillations, and commonly denotes a tradeſman who makes ſpirits from malt, *&c.*

Diſtillers are to make an entry of all warehouſes for keeping brandy, on pain of 20 l. and forfeiture of the liquor; and no brandy ſhall be ſold but in places entered, under penalty of 40 s. a gallon.

By ſtat. 24 Geo. II. diſtillers who ſhall knowingly ſell ſpirituous liquors to be unlawfully retailed, or to any unlicenſed retailer, forfeit 10 l. and treble the value of the liquors ſo ſold and delivered; and ſuch unlawful retailer, diſcovering and convicting the diſtiller, is intitled to his ſhare of the penalty, and indemnified againſt the penalties incurred by himſelf. The ſame act further provides, that no perſon whatſoever ſhall recover, either in law or equity, any debt for ſpirituous liquors under 20 s. contracted at one time; nor ſhall any item in any account for ſuch be allowed, where the value of ſuch item ſhall not amount to 20 s. at the leaſt.

Diſtillers are alſo to give notice to the gauger, before they receive any fermented waſh, of the quantity, *&c.* under penalty of 50 l. They are alſo to make entry of all veſſels for diſtillation, under the ſame penalty of 50 l. and forfeit 20 l. for defacing the gauger's mark.

DISTILLERY, the art of diſtilling brandies, and other ſpirits. See the article DISTILLATION.

To this art likewiſe belong the peculiar proceſſes of brewing and fermentation, the knowledge of proper additions, and the rectification of ſpirits. See the articles BREWING, FERMENTATION, ADDITION and RECTIFICATION.

DISTINCT NOTION, or IDEA, is that wherein the mind perceives a difference from all other ideas.

It will be uſeful, ſays Mr. Locke, to diſtinguiſh ideas as they are perceptions in our minds, from what they are in the bodies that cauſe ſuch perceptions in us; for we are not to think the former exact images and reſemblances of ſomething inherent in the ſubject, moſt of thoſe of ſenſation being in the mind no more the likeneſs of ſomething exiſting without us, than the names that ſtand for them are the likeneſs of our ideas, which yet upon hearing they are apt to excite in us.

DISTINCT BASE, in optics, is that diſtance from the pole of a convex glaſs, in which objects beheld through it appear diſtinct and well deſcribed, ſo that it is the ſame with the focus. See FOCUS.

The diſtinct baſe is cauſed by the collection of the rays that proceed from a ſingle point in the object into a ſingle point in the repreſentation; and therefore concave glaſſes, which diſſipate the rays, can have no real diſtinct baſe.

DISTINCTION, in logic, is an aſſemblage of two or more words, whereby diſparate things, or their conceptions, are denoted.

There are three kinds of diſtinctions taken from the three different modes of exiſtence, real, modal, and rational. The firſt is that between two ſubſtances, or the modes of two ſubſtances. The ſecond, or modal diſtinction, is that between ſeveral things, one whereof may exiſt without the other, but not *vice verſa*, the other without that. The third, or rational diſtinction, is that between ſeveral things which are really one and the ſame, and whereof one cannot exiſt without the other; nor *vice verſa*, the other without this: ſuch is that between a thing and its eſſence, between the eſſences and properties, *&c.* Of this diſtinction ſome authors admit two kinds, the one barbarouſly called *rationis ratiocinatæ*, having ſome foundation in things, as when we diſtinguiſh the juſtice of God from his mercy; the other called *rationis ratiocinantis*, which has no foundation at all, and therefore is by many rejected.

Metaphyſical DISTINCTION is the non-agreement of being, whereby this entity is not that, or one thing is not another. See the article ESSENCE.

DISTINCTION, *diſtinctio*, or *diſtinguo*, is alſo uſed, in the ſchools, as an expedient to evade an argument, or to clear up and unfold an ambiguous propoſition, which may be true in one ſenſe, and falſe in another: as we ſay, The reſpondent was hard preſſed, but he diſengaged himſelf by a diſtinguo.

DISTORTION, in medicine, a contraction of one ſide of the mouth, occaſioned by a convulſion of the muſcles of one ſide of the face: and it is likewiſe uſed to denote any part of an animal body, when it is ill placed or ill favoured.

It is very juſtly obſerved, that this terrible malady to the human ſhape has often been the

the mere effect of careleſſneſs and ill habits.

DISTORTOR ORIS, in anatomy, a muſcle otherwiſe called zygomaticus. See the article ZYGOMATICUS.

DISTRACTION, *diſtractio*, in chemiſtry, a forcible diviſion of ſubſtances from each other, which were before united, either by ſeparation or calcination.

DISTRACTION, in medicine, ſometimes denotes the act of pulling a fibre, membrane, or the like, beyond its natural extent.

DISTRAINING, in law, the ſame with attaching. See ATTACHING.

DISTRESS, in law, the ſeizing or diſtraining any thing for rent in arrear, or other duty unperformed.

The effect of this diſtreſs is to compel the party either to replevy the things diſtrained, and conteſt the taking, in an action of treſpaſs againſt the diſtrainer; or rather to oblige him to compound and pay the debt or duty, for which he was ſo diſtrained.

There are likewiſe compulſory diſtreſſes in actions, to cauſe a perſon appear in court; of which kind there is a diſtreſs perſonal of one's moveable goods, and the profits of his lands, for contempt in not appearing after ſummons: there is likewiſe diſtreſs real, of a perſon's immoveable goods. In theſe caſes none ſhall be diſtrained to anſwer for any thing touching their freeholds, but by the king's writ.

Diſtreſs may be either finite or infinite: Finite diſtreſs is that which is limited by law, in regard to the number of times it ſhall be made, in order to bring the party to a trial of the action. Infinite diſtreſs is that which is without any limitation, being made till the perſon appears: it is farther applied to jurors that do not appear, as upon a certificate of aſſiſe, the proceſs is venire facias, habeas corpora, and diſtreſs infinite.

It is alſo divided into grand diſtreſs and ordinary diſtreſs; of theſe the former extends to all the goods and chattels that the party has within the county. A perſon, of common right, may diſtrain for rents and all manner of ſervices: and where a rent is reſerved on a gift in tail, leaſe for life, or years, *&c.* though there be no clauſe of diſtreſs in the grant or leaſe, ſo as that he has the reverſion: but on a feoffment made in fee, a diſtreſs may not be taken, unleſs it be expreſly reſerved in the deed.

DISTRIBUTION, in a general ſenſe, the act of dividing a thing into ſeveral parts, in order to the diſpoſing each in its proper place.

DISTRIBUTION, in architecture, the dividing and diſpenſing the ſeveral parts and pieces which compoſe a building, as the plan directs.

Diſtribution of ornaments, is an equal orderly placing of the ornaments in any member of architecture.

DISTRIBUTION, in logic, is a kind of diviſion which diſtinguiſhes an univerſal whole into its ſeveral kinds of ſpecies; as diviſion is to diſtinguiſh an integral whole into its ſeveral parts.

The rules of a good diſtribution are much the ſame as thoſe of diviſion. See the article DIVISION.

DISTRIBUTION, in rhetoric, a kind of deſcription, whereby an orderly diviſion and enumeration is made of the principal qualities of the ſubject. David ſupplies us with an example of this kind, when in the heat of his indignation againſt ſinners, he gives a deſcription of their iniquity, "Their throat is an open ſepulchre; they flatter with their tongues; the poiſon of aſps is under their lips; their mouth is full of curſing and lies; and their feet are ſwift to ſhed blood."

DISTRIBUTION, in printing, the taking a form aſunder, ſeparating the letters, and diſpoſing them in the caſes again, each in its proper cell. See PRINTING.

DISTRIBUTIVE JUSTICE, is that whereby we give every perſon what properly belongs to him.

DISTRIBUTIVES, in grammar. See the article NUMERALS.

DISTRICT, in geography, a part of a province, diſtinguiſhed by peculiar magiſtrates, or certain privileges; in which ſenſe it is ſynonymous with hundred. See the article HUNDRED.

It is alſo uſed to denote the territory belonging to a city, town, or borough; or the extent of a judge's juriſdiction. See the articles TERRITORY and JURISDICTION.

DISTRINGAS, in law, a writ commanding the ſheriff, or other officer, that he diſtrain a perſon for debt to the king, *&c.* or for his appearance at a certain day. There is a great diverſity of this writ.

DISTRINGAS JURATORES, a writ directed to the ſheriff, whereby he is commanded to diſtrain upon a jury, to appear, and to return iſſues on their lands, *&c.* for non-appearance. This writ of diſtringas juratores iſſues for the ſheriff to have their bodies

bodies in court, &c. at the return of the writ.

DISVELLOPED, in heraldry, is ufed much in the fame fenfe with difplayed, as flying colours are faid to be difvelloped.

DISUNITE, in the manege, is faid of a horfe that drags his haunches in galloping.

DITCH, in country-affairs, a narrow channel or trench made for draining marfhy grounds, the conveyance of water, or inclofing fields.

Ditches for draining muft be more or lefs deep and wide, according as there is more or lefs water to be carried off. Ditches ufed about inclofures are five or fix feet wide, and proportionably deep, where there is no quick-fet hedges; but where thefe are fet on the banks, they are only three feet wide at the top, one at the bottom, and two deep: the flope is of great advantage, as by means of it the fides of the ditch are prevented from being wafhed down. See the articles DRAINS and INCLOSURE.

DITCH, in fortification, the fame with moat. See the article MOAT.

DITHYRAMBIC, fomething belonging to the dithyrambus, as a dithyrambic verfe, a dithyrambic poet, &c. See the next article.

The dithyrambic poetry was very bold and irregular, for the poets not only took the liberty to forge new words for the purpofe, but made double and compound words, which contributed very much to the magnificence of this fort of poetry.

DITHYRAMBUS, in antient poetry, a hymn in honour of Bacchus, full of tranfport and poetical rage.

This poetry owes its birth to Greece, and to the tranfports of wine; and yet art is not quite exploded, but delicately applied to guide and reftrain the dithyrambic impetuofity, which is indulged only in pleafing flights. Horace and Ariftotle tell us, that the antients gave the name of dithyrambus to thofe verfes wherein none of the common rules or meafures were obferved. As we have now no remains of the dithyrambus of the antients, we cannot fay exactly what their meafure was.

DITMARSH, a territory in the dutchy of Holftein. See HOLSTEIN.

DITONE, in mufic, an interval comprehending two tones. The proportion of the founds that form the ditone is 4 : 5, and that of the femiditone is 5 : 6. F. Parron makes the ditone the fourth kind of fimple concord, as comprehending two tones, according to Ariftotle, a greater and a lefs. Others make it the firft difcord, dividing the ditone into eighteen equal parts, or commas; the nine on the acute fide making the greater tone, as afferted by Salmon de Caux.

DITRIGLYPH, in architecture, the fpace between two triglyphs. See TRIGLYPH.

DITRIHEDRIA, in foffil hiftory, a genus of fpars with twice three fides, or fix planes, being formed of two trigonal pyramids joined bafe to bafe, without any intermediate column. See SPAR.

Of this genus there are five known fpecies, 1. One with long and pointed pyramids, found in the mines of Cornwall, and fome other parts of England. 2. One with long and broad pyramids, found loofe in the fiffures of the alabafter quarries of Blanckenberg in Germany. 3. One with fhort and broad pyramids found in the mines of Rammelfberg. 4. One with extremely broad depreffed pyramids, found in the alabafter quarries at Blanckenberg, and fometimes in the mines of Goffelaer in Saxony. 5. One with fhort but fharp pointed pyramids, found very frequently in the mines of the Hartz-foreft, and fometimes on Mendip Hills with us.

The fpecies of ditrihedria are diftinguifhed by the different figures of thefe pyramids.

DITTANY, *dictamnus*, in botany, &c. See the article DICTAMNUS.

DITTO, ufually written D°, in books of accounts, an italian word, fignifying *the aforementioned.*

DIVAL, in heraldry, the herb nightfhade, ufed by fuch as blazon by flowers and herbs, inftead of colours and metals, for fable or black.

DIVALIA, the fame with angeronalia. See the article ANGERONALIA.

This feaft was inftituted on occafion of a difeafe which deftroyed man and beaft. It was held on December 21, when the pontiffs performed facrifice in the temple of Voluptia, or the goddefs of joy and pleafure, and was the fame with Angerona, fuppofed to drive away all forrows and chagrins in life.

DIU, a little ifland and town on the coaft of Guzurat, in the hither India, and fubject to Portugal: eaft lon. 69°, north lat. 21° 15′.

DIVAN, a council chamber, or court of juftice, among the eaftern nations, particularly the Turks.

Divan-beghi, the ſuperintendant of juſtice in Perſia, whoſe place is the laſt of the ſix miniſters of the ſecond rank, who are all under the athemadauler, or firſt miniſter. To this tribunal of the divan-beghi appeals lie from ſentences paſſed by the governors: he has a fixed ſtipend of 50,000 crowns for adminiſtring juſtice: All the ſerjeants, uſhers, *&c.* of the court, are in his ſervice: he takes cognizance of the criminal cauſes of the chams, governors, and other great lords of Perſia, when accuſed of any fault. There are divan-beghi's not only at court, and in the capital, but alſo in the provinces, and other cities in the empire. The alcóran is the ſole rule of his adminiſtration of juſtice, which alſo he interprets at pleaſure. He takes no cognizance of civil cauſes, but all differences ariſing between the officers of the king's houſhold, and between foreign miniſters, are determined by him.

DIVER, *colymbus*, in ornithology, the engliſh name of a genus of birds, for the characters of which ſee Colymbus.

Of this genus there are a great many beautiful ſpecies. The ſpeckled diver, about the bigneſs of a tame duck, is repreſented in plate LXXIV. n° 1. The hinder part of the neck is of an aſh colour; the back and wings are black, ſpotted with white; the throat is black, and belly white. This is thought to be the cock of the red-throated ducker, or loon, repreſented *ibid.* n° 2. The upper part of the body of this laſt is of a dark grey colour, the quill feathers of the wings approaching to black: the legs and feet of both are of a blackiſh colour.

DIVERGENT, or Diverging lines, in geometry, are thoſe which conſtantly recede from each other.

Divergent rays, in optics, are thoſe which going from a point of the viſible object, are diſperſed, and continually depart one from another, in proportion as they are removed from the object: in which ſenſe it is oppoſed to convergent. See the article Converging.

Concave glaſſes render the rays divergent, and convex ones convergent.

Concave mirrors make the rays converge, and convex ones make them diverge. See Concave and Convex.

Divergent, or Diverging hyperbola, one whoſe legs turn their convexities towards one another, and run outwards quite contrary ways. See Hyperbola.

Point of DIVERGENCY. See the article *Virtual* Focus.

DIVERSIFYING, among orators, is the handling a ſubject different ways, in order to throw new light on it, and enforce it the ſtronger on the hearers.

According to Voſſius, there are ſix ways of doing this: 1. By enlarging on what was ſaid before. 2. By recapitulating. 3. By adding ſomething new. 4. By repeating the principal heads. 5. By urging the ſame arguments, only in a different order. 6. By imitating them.

DIVERSION, in military affairs, is, when an enemy is attacked in one place where they are weak and unprovided, in order to draw off their forces from another place, where they have made, or intend to make, an irruption. Thus the Romans had no other way in their power of driving Hannibal out of Italy, but by making a diverſion, in attacking Carthage.

Diversion, in phyſic, is when by means of medicines, an attempt is made to give a different turn to the flux of humours: thus blood-letting makes a great diverſion.

DIVERSITY, in logic, ſtands in oppoſition to identity. See Identity.

Diversity, in painting, conſiſts in giving every part or figure in a piece, its proper air and attitude.

The ſkilful painter has the penetration to diſcern the character of nature, which varies in all men: whence the countenances and geſtures of the perſons he paints continually vary.

DIVESTING, or Divestiture, in law, is uſed for the act of ſurrendering one's effects. By a contract of donation, or ſale, the donor, or ſeller, is ſaid to be diſſeiſed and diveſted of his property, in ſuch a commodity. In this ſenſe it ſtands contradiſtinguiſhed from inveſtiture, where the donee or purchaſer becomes inveſted with the property of the donor or ſeller. See the articles Investiture and Disseisin.

DIVIDEND, in arithmetic, the number propoſed to be divided into equal parts. It muſt always be greater than the diviſor. See Divisor and Division.

Dividend, in the exchequer, is one part of an indenture, as uſed in the ſtat. 10 Ed. I. c. 11.

Dividend, in law proceedings, is taken for a dividing of fees and perquiſites between officers of courts, ariſing from writs, *&c.*

Dividend


DIVERS.
No. 1.
No. 2.
T. Jefferys sculp.

DIVIDEND *of ſtocks*, is a ſhare, or proportion of the intereſt of ſtocks erected on public funds, as the ſouth-ſea, *&c.* divided among, and paid to the adventurers half yearly.

Stealing of any dividend warrants of the Bank, South-ſea company, Eaſt-india company, or of any other corporation, is made felony, with or without benefit of clergy, in the ſame manner as if the offender had ſtolen, or taken by robbery, goods to the value of the money due on ſuch dividend warrants. Stat. 2 Geo. II. c. 25, ſ. 3.

DIVIDEND, in the univerſity, ſignifies that part or ſhare which every one of the fellows equally divide among themſelves of their yearly ſtipend.

DIVINATION, the knowledge of things obſcure, or future, which cannot be attained by any natural means.

It was a received opinion among the heathens, that the Gods were wont to converſe familiarly with ſome men, whom they endowed with extraordinary powers, and admitted to the knowledge of their councils and deſigns. Plato, Ariſtotle, Plutarch, Cicero, and others, divide divination into two ſorts, or ſpecies, *viz.* natural and artificial. The former was ſo called, becauſe not attained by any rules or precepts of art, but infuſed or inſpired into the diviner without his taking any farther care about it, than to purify and prepare himſelf for the reception of the divine afflatus. Of this kind were all thoſe who delivered oracles, and foretold future events by inſpiration, without obſerving external ſigns or accidents. The ſecond ſpecies of divination was called artificial, becauſe it was not obtained by immediate inſpiration, but was the effect of experience and obſervation. Such was ſouthſaying, as depending upon human art and invention, which however was ſuppoſed not to be altogether deſtitute of divine direction and concurrence, and ſuch was divination by lots. Of this ſort there were various kinds, as by ſacrifices, entrails, flame, cakes, flour, wine, water, augury, birds, lots, verſes, omens, *&c.* The ſeveral ſorts of divination are alectoromantia, alphitomancy, arithmomancy, axinomancy, bellomancy, catoptromancy, ceromancy, chiromancy, cledomancy, dactiliomancy, gaſtromancy, geomancy, hydromancy, lithomancy, necromancy, oneirocritica, *&c.* See the article ALECTOROMANTIA, *&c.*

DIVINE, ſomething relating to God. See the article GOD.

DIVINE STONE, in natural hiſtory, a ſpecies of the jaſper. See JASPER.

The indians attribute great medicinal virtues to this ſtone: they wear it externally as a cure for the gravel; they ſay it promotes urine extremely, and ſeldom fails to bring away large quantities of gravel with it, when there has been any lodged in the paſſages; they wear it alſo by way of amulet, to preſerve them from the bites of venomous animals, and tie it to the part bitten, by way of cure.

DIVING, the art of deſcending under water, to conſiderable depths, and abiding there a competent time. The uſes of diving are conſiderable, particularly in fiſhing for pearls, corals, ſponges, wrecks, of ſhips, *&c.* See PEARL, *&c.*

There have been various engines contrived to render the buſineſs of diving ſafe and eaſy; the great point is to furniſh the diver with freſh air, without which he muſt either make but a ſhort ſtay, or periſh. Thoſe who dive for ſponges in the Mediterranean, carry down ſponges dipt in oil in their mouths, but conſidering the ſmall quantity of air that can be contained in the pores of a ſponge, and how much that little will be contracted by the preſſure of the incumbent air, ſuch a ſupply cannot ſubſiſt a diver long, ſince a gallon of air is not fit for reſpiration above a minute. See the next article.

DIVING-BELL, a machine contrived for the ſafe conveyance of a diver to any reaſonable depth, and whereby he may ſtay more or leſs time under water, as the bell is greater or leſs.

That the reader may have a juſt idea of the diving-bell, according to the lateſt improvements by Dr. Halley, and Mr. Triewald of Stockholm, we have here exhibited two figures of the ſame. The firſt (plate LXXV. fig. 1. n° 1.) is that of Dr. Halley's form, which was three feet wide at top, five at bottom, and eight feet high, and contained about ſixty-three cubic feet, or near eight hogſheads in its concavity.

This was coated with lead, ſo heavy, that it would ſink empty, and the weight was diſtributed about the bottom IK, ſo that it would go down in a perpendicular poſition, and no other. In the top was fixed a ſtrong but clear glaſs D, to let in the light from above; and likewiſe

wife a cock, as at B, to let out the hot air that had been breathed; and below, was fixed a circular feat, L M, for the divers to fit on; and laftly, from the bottom was hung, by three ropes, a ftage for the divers to ftand on, to do their bufinefs. This machine was fufpended from the maft of a fhip by a fprit, which was fufficiently fecured by ftays to the maft-head, and was directed by braces to carry it over-board, clear of the fide of the fhip, and to bring it in again.

To fupply the bell with air under water, two barrels, fuch as C, of about fixty-three gallons each, were made, and cafed with lead, fo that they might fink empty, each having a hole in its loweft part, to let in the water, as the air in them is condenfed in their defcent, and to let it out again when they were drawn up full from below. And to a hole in the top of the barrel was fixed a hofe, or hollow pipe, well prepared with bees-wax and oil, which was long enough to fall below the hole at the bottom, being funk with a weight appended, fo that the air in the upper part of the barrels could not efcape, unlefs the lower end of thefe pipes were firft lifted up.

Thefe air barrels were fitted with tackle proper to make them rife and fall alternately, like two buckets in a well. In their defcent they were directed by lines faftened at the under edge of the bell to the man ftanding on the ftage to receive them, who, by taking up the ends of the pipes above the furface of the water in the bell, gave occafion for the water in the barrels to force all the air in the upper parts into the bell, while it entered below, and filled the barrels; and as foon as one was difcharged by a fignal given, it was drawn up, and the other defcended to be ready for ufe.

As the cold air rufhed into the bell from the barrel below, it expelled the hot air (which was lighter) through the cock B, at the top of the bell, which was then opened for that purpofe. By this method air is communicated fo quick, and in fuch plenty, that the doctor tells us, he himfelf was one of the five who was at the bottom in nine or ten fathom water, for above an hour and an half at a time, without any fort of ill confequence; and he might continue there fo long as he pleafed, for any thing that appeared to the contrary.

In going down, it is neceffary it fhould be very gentle at firft, that the denfe air may be infpired to keep up, by its fpring, a balance to the preffure of the air in the bell: upon each twelve feet defcent, the bell is ftopt, and the water that enters is driven out by letting in three or four barrels of frefh air.

By the glafs above, fo much light was tranfmitted, when the fun fhone, that he could fee perfectly well to write and read, and by the return of the air-barrels, he could fend up orders, written with an iron pen, on fmall pieces of lead, directing, that they were to be moved from place to place: but in dark weather, when the fea was rough and troubled, it would be as dark as night, in the bell; but then the doctor perceived he could keep a candle burning in the bell, as long as he pleafed, it being found, by experiment, that one candle confumes much about the fame quantity of confined air, as one man does, *viz.* about a gallon per minute.

The only inconvenience the doctor complained of, was, that upon firft going down, they felt a fmall pain in their ears, as if the end of a quill were forcibly thruft into the hole of the ear. This may proceed from its being fome time before the air can get from the mouth, through the fmall canal of the euftachian tube, which leads to the inner cavity of the ear, where, when it comes, it makes an equilibrium with the outward air, preffing on the tympanum, and thus the pain, for a fhort time, ceafes: then defcending lower, the pain of the ear returns, and is again abated; and fo on, till you come down to the bottom, where the air is of the fame denfity continually.

This bell was fo improved by the doctor, that he could detach one of his divers to the diftance of fifty, or a hundred yards from it, by a contrivance of a cap, or head-piece, fomewhat like an inverted hand-bafket, as at F, with a glafs in the fore-part, for him to fee his way through. This cap was of lead, and made to fit quite clofe about his fhoulders; in the top of it was fixed a flexible pipe, communicating with the bell, and by which he had air, when he wanted, by turning a ftop cock near his head-piece. There was alfo another cock at the end in the bell, to prevent any accident happening from the perfon without. This perfon was always well cloathed with thick flannels, which were warmed upon him, before he left the bell, and would

not

not suffer the cold water to penetrate. His cap contained air enough to serve him a minute or two, then by raising himself above the bell, and turning the cock F, he could replenish it with fresh air. This pipe he coiled round his arm, which served him as a clue to find his way to the bell again.

This diving bell received its last improvement from Mr. Martin Triewald F. R. S. and military architect to his swedish majesty. The manner and form whereof is shewn in a figure of his own drawing (ibid. n° 2.) A B is the bell, which sinks with leaden weights D, D, appended to the bottom; the substance of the bell is copper, and tinned within all over: the bell is illuminated with three strong convex lenses G, G, G, with copper lids H, H, H, to defend them. The iron ring, or plate E, serves the diver to stand on, when he is at work, and it is suspended at such a distance from the bottom of the bell, by the chains F, F, F, that when the diver stands upright, his head is just above the water in the bell, where it is much better than higher up in it, because the air is colder, and consequently more fresh, and fit for respiration: but as there is occasion for the diver to be wholly in the bell, and his head of course in the upper part, Mr. Triewald has contrived that, even there, when he has breathed the hot air as long as he well can, by means of a spiral copper tube *b c*, placed close to the inside of the bell, he may draw the cooler and fresher air from the lowermost parts; to which end, a flexible leather tube, about two feet long, is fixed to the upper end of the tube at *b*; and to the other end of this tube is fixed an ivory mouth-piece for the diver to hold in his mouth, by which to respire the air from below.

DIVING-BLADDER, a term used by Borelli, for a machine which he contrived for diving under water to great depths. The vesica, or bladder, as it is called, is to be of brass or copper, and about two feet diameter. This is to contain the diver's head, and is to be fixed to a goat's skin exactly fitted to the body of the diver. Within the vesica are pipes, by means of which, a circulation of air is contrived, and the person carries an air pump by his side, in order to make himself heavier and lighter, as the fishes do by contracting or dilating their air-bladder.

DIVINITY, properly signifies the nature, quality, and essence of the true God. See the article GOD.

The heathen divinities may be reduced to three classes, 1. Theological, representing the divine nature under divers attributes. Thus Jupiter is the absolute power of God, Juno his justice, &c. 2. Physical. Thus Eolus is that power in nature which collects vapours and exhalations, in order to form winds. 3. Moral. For example, the furies are only the secret reproaches and stings of conscience.

DIVINITY, is also used in the same sense with theology. See THEOLOGY.

DIVISIBILITY, that property by which the particles of matter in all bodies are capable of a separation, or disunion from each other.

The Peripatetics and Cartesians hold divisibility to be an affection of all matter. The Epicureans again, allow it to agree to every physical continuum, but they deny that this affection agrees to all bodies, for the primary corpuscles or atoms they maintain to be perfectly insecable and indivisible. See ATOM.

As it is evident that body is extended, so it is no less evident that it is divisible; for since no two particles of matter can exist in the same place, it follows, that they are really distinct from each other, which is all that is meant by being divisible. In this sense the least conceivable particle must still be divisible, since it will consist of parts which will be really distinct. To illustrate this by a familiar instance, let the least imaginable piece of matter be conceived lying on a smooth plain surface, it is evident the surface will not touch it every where: those parts therefore which it does not touch, may be supposed separable from the others, and so on, as far as we please; and this is all that is meant when we say matter is infinitely divisible.

The infinite divisibility of mathematical quantity is demonstrated thus geometrically. Suppose the line A D (plate LXXV. fig. 2.) perpendicular to B F, and another, as G H, at a small distance from it, also perpendicular to the same line: with the centers C, C, C, &c. describe circles cutting the line G H in the points *e*, *e*, *e*, &c. Now the greater the radius A C is, the less is the part *e* H. But the radius may be augmented in infinitum, so long therefore, the part *e* H may be divided into still less portions,

tions, consequently it may be divided in infinitum.

All that is supposed in strict geometry, (says Mr. Maclaurin) concerning the divisibility of magnitude, amounts to no more than that a given magnitude may be conceived to be divided into a number of parts, equal to any given or proposed number. It is true, that the number of parts into which a given magnitude may be conceived to be divided, is not to be fixed or limited, because no given number is so great but a greater may be conceived and assigned: but there is not, therefore, any necessity of supposing the number of parts actually infinite; and if some have drawn very abstruse consequences from such a supposition, yet geometry ought not to be loaded with them.

How far matter may actually be divided, may in some measure be conceived from hence, that a piece of wire gilt with so small a quantity as eight grains of gold, may be drawn out to a length of thirteen thousand feet, the whole surface of it still remaining covered with gold. We have also a surprising instance of the minuteness of some parts of matter from the nature of light and vision. Let a candle be lighted, and placed in an open plane, it will then be visible two miles round, and consequently was it placed two miles above the surface of the earth, it would fill with luminous particles a sphere whose diameter was four miles, and that before it had lost any sensible part of its weight. A quantity of vitriol being dissolved, and mixed with nine thousand times as much water, will tinge the whole, consequently will be divided into as many parts as there are visible portions of matter in that quantity of water. There are perfumes which without a sensible diminution of their quantity, shall fill a very large space with their odoriferous particles, which must therefore be of an inconceivable smallness, since there will be a sufficient number in every part of that space, sensibly to affect the organ of smelling. Dr. Keill demonstrates that any particle of matter how small soever, and any finite space how large soever being given, it is possible for that small particle of matter to be diffused through all that space, and to fill it in such a manner, as that there shall be no pore in it whose diameter shall exceed any given line. See EFFLUVIUM.

The chief objections against the divisibility of matter in infinitum are, that an infinite cannot be contained by a finite, and that it follows from a divisibility in infinitum either that all bodies are equal, or that one infinite is greater than another. But the answer to these is easy, for the properties of a determined quantity are not to be attributed to an infinite considered in a general sense; and who has ever proved that there could not be an infinite number of infinitely small parts in a finite quantity; or that all infinites are equal? The contrary is demonstrated by mathematicians in innumerable instances. See the article INFINITE, and 'S Gravesande, Elem. Mathem. lib. 1. cap. iv.

DIVISION, in general, is the separating a thing into two or more parts.

DIVISION, in arithmetic, one of the four fundamental rules, whereby we find how often a less number, called the divisor, is contained in a greater, called the dividend; the number of times which the divisor is contained in the dividend being termed the quotient.

In effect, division is only a compendious subtraction; for since the divisor is so many times contained in the dividend as there are units in the quotient, if we subtract the former from the latter as many times as possible, the sum of these subtractions will be equal to the quotient.

To perform this operation with expedition, one ought to be previously well acquainted with the table of multiplication: thus, if I know that $5 \times 5 = 25$, it will be easy for me to say how many times 5 is contained in 25; and so in other instances, where the dividend does not exceed the square of the divisor. But where this is the case, we must follow a different method, which is this: set down the divisor first, and then the dividend, both in the same line, but with a stroke of your pen between them, as in the example in the margin; then beginning from the left hand, set a dot under that part of the dividend in which the divisor can be found; which is the figure 7, wherein the divisor 6 is found 1: place this 1 after the dividend, only with a stroke between them, and it will make the first figure

```
divis. divid. quot.
   6) 7284 (1214
      ....
      6
      —
      12
      12
      —
       8
       6
      —
      24
      24
```

figure of the quotient: you muſt next multiply the diviſor by this number, *viz.* 6×1, and ſubſtract the product from 7, and there will remain 1; after which place the next figure of the dividend, *viz.* 2, marking it with a dot, that you may know how many figures of the dividend are taken down. Find how many times the diviſor is contained in theſe two figures, *viz.* 12, which is twice exactly: place this 2 in the quotient after the former one, 1; and then multiplying and ſubſtracting, you will find no remainder. However, taking down and dotting the next figure of the dividend, *viz.* 8, you will find 6 only once in it; place this 1 in the quotient, and multiplying and ſubſtracting as formerly, there will remain 2; after which place the laſt figure of the dividend, which is alſo to be dotted, and you will have 24, wherein 6 is contained juſt 4 times; place this 4 in the quotient, and the operation is finiſhed. Hence it appears that the diviſor 6 is contained in the dividend 7284 juſt 1214 times, as expreſſed in the quotient.

The method is much the ſame, when there are ſeveral figures in the diviſor: thus, in the example annexed, as 54 is not contained once in 2 or 24, we muſt take down three figures, *viz.* 240, and the firſt dot is to be placed under the 0. We then proceed, and find 54 contained in 240 four times: this 4 we place in the quotient, and multiplping the diviſor 54 by it, and ſubſtracting the product, *viz.* 216 from 240, there remains 24. After this place the next figure of the dividend, *viz.* 8, and the ſum is 248, in which 54 is found 4 times. Multiply and ſubſtract as formerly, and there will remain 32; after which placing the laſt figure of the quotient, *viz.* 4, you will have the ſum 324, in which 54 is found juſt 6 times. So that the diviſor 54 is contained in the dividend 24084 exactly 446 times, as expreſſed in the quotient.

```
54) 24084 ( 446
      . ..
    216
    ----
     248
     216
    ----
      324
      234
     ----
```

Division *of fractions.* See the articles Decimal and Fraction.

Division, in algebra, is performed by placing the dividend above a ſmall line, and the diviſor under it; expunging any letters that may be found in all the quantities of the dividend and diviſor, and dividing the co-efficients of all the terms by any common meaſure. Thus, if $10ab + 15ac$, is to be divided by $20ad$, they are firſt placed in this manner, $\frac{10ab+15ac}{20ad}$; which after expunging the letter a out of all the terms, and dividing all the co-efficients by 5, is reduced to $\frac{2b+3c}{4d}$. In the ſame manner $2b)\,ab+bb = \frac{ab+bb}{2b} = \frac{a+b}{2}$. Again, $12ab)\,30ax-54ay = \frac{30ax-54ay}{12ab} = \frac{5x-9y}{2b}$; and $4aa)\,8ab+6ac = \frac{8ab+6ac}{4aa} = \frac{4b+3c}{2a}$; and, to add no more, $2bc)\,5abc = \frac{5abc}{2bc} = \frac{5a}{2}$.

With reſpect to the ſigns, if thoſe of the diviſor and dividend be like, the ſign of the quotient muſt be +; but if they are unlike, the ſign muſt be −.

Powers of the ſame root, are divided by ſubſtracting their exponents, as they are multiplied by adding them. Thus if a^5 be divided by a^2, the quotient is $a^{5-2} = a^3$; and b^8 divided by b^2, gives the quotient $b^{8-2} = b^6$; and ſo in other caſes.

If the quantity to be divided is compound, then its parts muſt be ranged according to the dimenſions of ſome one of its letters as in the following example. In the dividend $a^2 + 2ab + b^2$, they are ranged according to the dimenſions of a, the quantity a^2, where a is of two dimenſions, being placed firſt; $2ab$, where it is of one dimenſion, next; and b^2, where a is not to be found, laſt. The diviſor $a+b$ being ranged in the ſame manner, you are to divide the firſt term of the dividend by the firſt term of the diviſor; and after ſetting down the quotient, which in this caſe is a, multiply this quotient by the whole diviſor, and ſubſtract the product, *viz.* $a^2 + ab$ from the two firſt terms of the dividend $a^2 + 2ab$, and the remainder ab, together with the laſt term b^2, gives a new dividend $ab + b^2$. Divide the firſt term of this new dividend, by the firſt term of the diviſor, and ſet down the quotient, which in this example is b; then multiplying the whole diviſor by this part of the quotient, ſubſtract the

$$
\begin{array}{l}
a+b)\,a^2+2ab+b^2\,(a+b \\
\quad\; \underline{a^2+ab} \\
\qquad\quad ab+b^2 \\
\qquad\quad \underline{ab+b^2} \\
\qquad\quad\;\; 0 \quad 0
\end{array}
$$

the product from the new dividend; and if there is no remainder, as is the caſe here, the diviſion is finiſhed. If there is a remainder, you are to proceed after the ſame manner till no remainder is left, or till it appear that there will always be ſome remainder, as in the annexed examples.

Example I. without any remainder.

$$3a-6)\,6a^4-96\,(2a^3+4a^2+8a+16$$
$$6a^4-12a^3$$
$$12a^3-96$$
$$12a^3-24a^2$$
$$24a^2-96$$
$$24a^2-48a$$
$$48a-96$$
$$48a-96$$
$$0 \quad 0$$

Example II. with a remainder.

$$a+x)\,a^2+x^2\,(a-x+\frac{2x^2}{a}\quad\frac{2x^3}{a^2}+\frac{2x^4}{a^3}\ \&c.$$
$$a^2+ax$$
$$-ax+x^2$$
$$-ax-x^2$$
$$+2x^2$$
$$+2x^2+\frac{2x^3}{a}$$
$$-\frac{2x^3}{a}$$
$$-\frac{2x^3}{a}\quad\frac{2x^4}{a^2}$$
$$+\frac{2x^4}{a^2},\ \&c.$$

In this laſt example, the ſigns are alternately + and —, the co-efficient is conſtantly 2, after the two firſt terms, and the letters are powers of x and a; ſo that the quotient may be continued as far as you pleaſe, without any farther diviſion. But in common examples of diviſion, after you come to a remainder of one term, as $2x^2$, it is uſually ſet down in the quotient, with the diviſor under it, after the other terms; and the quotient in the laſt example will ſtand thus, $a-x+\frac{2x^2}{a+x}$.

As for the other ſigns of diviſion, ſee the article CHARACTER.

DIVISION, among logicians, is the explication of a complex idea, by enumerating the ſimple ideas whereof it is compoſed; in which ſenſe it is nearly allied to definition, only that this laſt regards names and things, whereas diviſion is employed wholly about ideas.

When the parts of an idea are divided, in order to a clearer explication of the whole, this is called a ſubdiviſion: thus, a year is divided into twelve months, a month is ſubdivided into weeks, weeks into days, days into hours, and ſo on.

The rules for a good diviſion are theſe, that the members entirely exhauſt the whole; that they be oppoſite; that ſubdiviſions be not too numerous; that the whole be firſt divided into its larger parts, and theſe into the more remote and minute parts.

DIVISION, in natural philoſophy, is the taking a thing to pieces, that we may have a more complete conception of the whole: this is frequently neceſſary in examining very complex beings, the ſeveral parts of which cannot be ſurveyed at one view. Thus, to learn the nature of a watch, the workman takes it to pieces, and ſhews us the ſpring, wheels, axles, pinions, ballances, dial-plate, pointer, caſe, &c. and after deſcribing the uſes and figures of each of them apart, explains how they contribute to form the whole machine.

DIVISION, in muſic, the dividing the interval of an octave, into a number of leſs intervals. See OCTAVE.

The fourth and fifth divide the octave perfectly, though differently: when the fifth is below, and ſerves as a baſs to the fourth, the diviſion is called harmonical; but when the fourth is below, it is called arithmetical.

To run a diviſion, is to play, or ſing, after the manner above-mentioned; that is, to divide the intervals of an octave, fifth, fourth, &c. into as many parts, and as agreeably as poſſible, which depends intirely upon taſte and fancy.

DIVISION, in rhetoric, the arrangement of a diſcourſe under ſeveral heads, each of which is to be ſeparately ſpoken to.

DIVISION *of proportion.* If four quantities be proportional, $a:b::c:d$; then the aſſumption of the difference between the antecedent $a-b$, or $b-a$, to either the antecedent a, or conſequent b, of the firſt ratio a to b; and the difference between the antecedents $c-d$ or $d-c$ to either the antecedent b, or conſequent d of the ſecond ratio c to d; is called diviſion of proportion. See PROPORTION.

DIVISIONS *of a battalion,* are the ſeveral parcels into which a battalion is divided in marching. The lieutenants and enſigns march before the diviſions.

DIVISION, in the ſea-language, the third part

part of a fleet of men of war, and sometimes the ninth part: which last happens when the fleet is divided into three squadrons: for then each squadron is distributed into three divisions. In a sea-engagement, the order of battle is to place all the squadrons, and all the divisions of each side, in one line. This order is kept as long as the wind, and other circumstances will permit.

DIVISOR, in arithmetic, the number that divides another, called the dividend; or, which shews into how many parts the dividend is to be divided. See DIVISION.

DIUL, a port-town of Asia, situated on the indian ocean, westward of the river Indus, and sixty miles west of the city of Tatta: east lon. 67°, and north lat. 25° 15′.

DIVORCE, a breach or dissolution of the bond of marriage. See MARRIAGE.

The usual divorces, among us, are of two kinds, *viz.* *a mensa & thoro*, from bed and board, and *a vinclo matrimonii*, from the bond or tie of marriage. That *a mensa & thoro*, does not dissolve the marriage; since the cause thereof is subsequent to it, and, at the same time, supposes the marriage to be lawful: and this divorce may be on account of adultery in either of the parties, for cruelty of the husband, *&c.* As this divorce dissolves not the marriage, it does not debar the woman of her dower, nor bastardize her issue, or make void any estate for the life of the husband and wife, *&c.* A divorce *a vinclo matrimonii* entirely dissolves the marriage, as a pre-contract with some other person, consanguinity, or affinity within the levitical degrees, impotency, impuberty, *&c.* The consequences attending this last divorce are, that the dower is gone thereby, and the children begotten between the parties divorced are bastards: but here, it is said, the wife shall receive all again that she brought with her; because the nullity of the marriage arises from some impediment, and the goods of the wife were given for her advancement in marriage, which now ceases: yet this is when the goods are not spent; for if the husband gives them away during the coverture, without any collusion, it shall be binding to her. A divorce remains good so long as the sentence continues, and issue of a second marriage shall inherit lands until such sentence is repealed. See BASTARD. On the divorce *a vinclo, &c.* the parties are at liberty to marry again; and in divorces for adultery, several acts of parliament have allowed the innocent party marriage with another person. Divorces are only to be had by consent of parliament.

Among the Hebrews, divorce was made for the advantage of the wives, that they might not be discharged nor turned out of doors at pleasure: it was necessary that a bill of divorce should be executed in form by the husband: the wife was obliged to remain ninety days after the divorce, before she married again, that it might be known, if she proved with child, whose it was. The first husband was never allowed to marry her again, after being married, or even contracted, to another; otherwise he might. The mahometans, usually fond of copying after the jews, differ from them in this particular, allowing a man to take his wife again, though he had divorced her three times. It is observed, that the women among the Jews, in the latter time of their government, took the same liberty as the men, and divorced their jealous and disagreeable husbands.

The grecian laws concerning divorces, were different: some permitted men to put away their wives on slight occasions: the Cretans allowed it to any man that was afraid of having too great a number of children. The Athenians likewise did it upon very small grounds, but not without giving a bill, wherein was contained the reasons of the divorce, to be approved, if the party divorced made an appeal to the chief magistrate. The Spartans, though marrying without much nicety in choice, seldom divorced their wives. At Athens, persons that divorced their wives, were obliged to return their portions, or to pay them an alimony: here a woman might also sue for a divorce.

The distinction of *repudium* and *divortium*, among the Romans, was owing to the nicety of their lawyers: the first they made the breaking of a contract; the last a separation after actual matrimony. By the laws of Romulus, a man was at liberty to leave his wife, but not a wife to leave her husband. The man might divorce his wife, either upon poisoning her children, counterfeiting his private keys, or for the crime of adultery: but if he put her away upon any other occasion, one moiety of his estate was to be given to his wife, and the other was to fall to the goddess Ceres.

DIURESIS, in medicine, an excretion of urine: whence

DIURETICS,

DIURETICS, in pharmacy, ſuch ſimples as increaſe the diſcharge of urine; or which are ſuppoſed to have a power of removing obſtructions in the urinary paſſages. Diuretics muſt increaſe the liquor to be ſecreted in the proper glandules, and are of the five following kinds: the firſt contains all relaxing and emollient decoctions, emulſions, &c. which do not ſtimulate, but only remove obſtructions, by relaxing the veſſels. The ſecond comprehends all thoſe which diſſolve and dilute the blood. The third contains three kinds of medicine. 1. All acids which ſtimulate the veſſels. 2. All ſaline bodies. 3. All fixed and volatile ſalts. The fourth takes in all that preſerve a moderate heat of the body, without ſweat. The fifth claſs contains thoſe whoſe effects diſcover themſelves about the kidneys and bladder; alſo all acrid and ſolvent diuretics.

DIURNAL, in aſtronomy, ſomething relating to the day, in oppoſition to nocturnal, which regards the night.

DIURNAL ARCH, the arch or number of degrees that the ſun, moon, or ſtars deſcribe between their riſing and ſetting.

DIURNAL CIRCLE. See CIRCLE.

DIURNAL *motion of a planet*, is ſo many degrees and minutes as any planet moves in twenty-four hours. Hence the motion of the earth about its axis, is called its diurnal motion. See EARTH.

DIURNAL is alſo uſed in ſpeaking of what belongs to the nycthemeron, or natural day of twenty-four hours, in oppoſition to annual, menſtrual, &c. The diurnal phænomena of the heavenly bodies, ariſe from the motion of the earth round its axis. For ſince the earth turns round its own axis from weſt to eaſt, every ſpectator on its ſurface muſt neceſſarily be carried round it the ſame way; and conſequently thoſe parts of the heavens which lie hid towards the eaſt, will by and by come into his ſight, and thoſe which are viſible to him, will depart out of it towards the weſt. From hence it is that the ſpectator not being ſenſible of his own motion (the reaſon of which is, becauſe all things about him move along with him) imagines the whole heavens to turn round the contrary way, *viz.* from eaſt to weſt every twenty-four hours, which is nearly the time in which the earth performs one revolution about its axis. This may be illuſtrated in the following manner.

Let the circle S T V (plate LXXV. fig. 3.) repreſent the earth; S, the place of the ſpectator; A B C, ſo much of the heavens as is viſible to him in that ſituation; and let A be the place of the ſun, or any other of the heavenly bodies. When S, the place of the ſpectator, is carried by the rotation of the earth about its axis to T, the viſible part of the heavens will become B A D; and the point A, which before was juſt at one edge of the viſible portion of the heavens, is now in the midſt of it, or directly over the ſpectator's head. Again, when the ſpectator is got to V, the viſible part of the heavens is become A D X, and the point A is got to the other extremity of it, and juſt ready to diſappear; after which it is ſeen no more till the ſpectator arrives at the point S again. From this motion of the earth ariſes that apparent revolution of the planets and fixed ſtars once in twenty-four hours, as alſo that of the ſun, and therewith the ſucceſſion of day and night. See the article EARTH.

DIURNARY, *diurnarius*, an officer in the greek empire, who wrote down in a book, kept for that purpoſe, whatever the prince did, or ordered, &c. every day.

DIVUS and DIVA, in antiquity, appellations given to men and women who had been deified. See APOTHEOSIS.

We find this title on medals ſtruck for the conſecration of an emperor or empreſs: thus, DIVVS IVLIVS, DIVA FAVSTINA AVG. &c.

DIXMUDE, a town of Flanders, ſituated on the river Ypres, about eleven miles north of the city of Ypres, and thirty-three weſt of Ghent: eaſt long. 2° 40′, and north lat. 51°.

DIZIER, or St. DIZIER, a city of Champaigne, in France, ſituated on the river Marne, about forty-five miles north-eaſt of Troyes: eaſt long. 5°, and north lat. 48° 32′.

DIZZINESS, in medicine, a diſeaſe of the head, called by phyſicians vertigo. See the article VERTIGO.

DO, in muſic, a note of the italian ſcale, correſponding to *ut* of the common gamut. See the article GAMUT.

DOB-CHICK, in ornithology, the engliſh name of the colymbus minor. See the article COLYMBUS.

It is a pretty little bird, ſmaller than the common teal; and, as it is ſeen ſwimming, appears like the young of ſome of the duck-kind; not yet fledged or feathered. But what is moſt ſingular in it, is, its having abſolutely no tail. See plate LXXV. fig. 4. n° 1.

There

There are several other species of this bird, one of the most elegant of which is the eared dob-chick, of a blackish brown on the upper part of the back, except the ridge thereof, which is white; the ears are formed of a tuft of loose, long, and reddish feathers. *Ibid.* n° 2.

DOCIMASIA, in greek antiquity, a probation of the magistrates and persons employed in public business at Athens. It was performed publickly in the forum, where they were obliged to give account of themselves and their past life before certain judges. Among several questions proposed to them, we find the following, whether they had been dutiful to their parents, had served in the wars, and had a competent estate.

DOCK, *lapathum*, in botany and medicine. See LAPATHUM.

DOCK, or DOCKING, in law, an expedient for cutting off an estate-tail in lands or tenements that the owner may be enabled to sell, give, or bequeath the same.

DOCK, in maritime affairs, is a pit, great pond, or creek, by the side of an harbour, made convenient either for the building or repairing of ships. It is of two sorts, 1. Dry-dock, where the water is kept out by great flood-gates, till the ship is built or repaired, when the gates are opened, and the water let in to float and launch her. 2. Wet-dock, a place where the ship may be hauled into, out of the tide's way, and so dock herself, or sink herself a place to lie in.

DOCK, in the manege, called by the French troussequeue, is a large case of leather, as long as the dock of a horse's tail, which covers the tails of leaping horses. It is made fast by straps to the crupper, and has leathern thongs that pass between his thighs, and along the flanks to the saddle-straps, in order to keep the tail tight, and to hinder it to whisk about, or make the horse appear broader at the croupe.

DOCK, among sportsmen, the fleshy part of a boar's chine, between the middle and the buttocks.

DOCK-YARDS, in ship-building, are magazines of all sorts of naval stores. The principal ones in England are those of Chatham, Portsmouth, Plymouth, Woolwich, Deptford, and Sheerness. In time of peace, ships of war are laid up in these docks; those of the first rates mostly at Chatham, where, and at other yards, they receive from time to time such repairs as are necessary. These yards are generally supplied from the northern crowns with hemp, pitch, tar, rosin, &c. but as for masts, particularly those of the larger size, they are brought from New England.

How much it imports the good of the public to keep these magazines constantly replenished, every one is able to judge: and it were to be wished the improving the before-mentioned commodities, in our english plantations, might meet with all possible encouragement, lest, one time or other, it may prove difficult to get them elsewhere.

DOCKET, a little bill tied to wares or goods, directed to the person or place they are to be sent to.

DOCKET, or DOGGET, in law, signifies a brief in writing, made on a small piece of paper, or parchment, containing the purport and effect of a large writing. The rolls of judgment, when brought into the court of common pleas, are entered on the docket of that term: and attorneys keep docket-books, wherein they enter judgments.

DOCTOR, a person who has passed all the degrees of a faculty, and is impowered to teach or practise the same; thus we say, doctor in divinity, doctor in physic, doctor of laws.

The title of doctor seems to have been created in the XIIth century, instead of *master*, and established with the other scholastic degrees of batchelors and licentiates, by Peter Lombard and Gilbert Porreus, then the chief divines of the university of Paris. Gratian did the same thing, at the same time, in the university of Bologna. Though the two names of *doctor* and *master* were used a long time together, yet many think that their functions were different, the masters teaching the human sciences, and the doctors those sciences depending on revelation and faith. Spelman takes the title of doctor not to have commenced till after the publication of Lombard's Sentences, about the year 1140, and affirms that such as explained that work to their scholars were the first that had the appellation of doctors.

To pass doctor in divinity at Oxford, it is necessary the candidate have been four years batchelor of divinity. For doctor of laws, he must have been seven years in the university to commence batchelor of law, five years after which he may be admitted doctor of laws. Otherwise in three years after taking the degree of master

master of arts, he may take the degree of batchelor in laws, and in four years more that of doctor: which same method and time are likewise required to pass the degree of doctor in physic. At Cambridge, to take the degree of doctor in divinity, it is required the candidate have been seven years batchelor of divinity: though in several colleges the batchelor's degree is dispensed with, and they may go out *per saltum*. To commence doctor in laws, the candidate must have been five years batchelor of laws, or seven years master of arts. To pass doctor in physic, he must have been batchelor in physic five years, or seven years master of arts. It is remarkable, that by a statute of 37 Hen. VIII. a doctor of civil law may exercise ecclesiastical jurisdiction, though a layman.

DOCTOR, is also an appellation adjoined to several specific epithets, expressing the merit of some of the schoolmen: thus Alexander Hales is called the irrefragable doctor; Thomas Aquinas, the angelic doctor; St. Bonaventure, the seraphic doctor; John Duns Scotus, the subtile doctor; Raimond Lully, the illuminated doctor; Roger Bacon, the admirable doctor, *&c.*

DOCTOR *of the church*, a title given to certain of the fathers, whose doctrines have been most generally received: of these are usually reckoned four in the greek church, *viz.* St. Athanasius, St. Basil, St. Gregory Nazianzen, and St. Chrysostom: and three in the latin church, namely, St. Jerom, St. Augustine, and Gregory the great.

DOCTOR, διδασκαλος, in the greek church, is a particular officer appointed to interpret part of the scripture. He who explains the gospels is called doctor of the gospels; he who explains St. Paul's Epistles, doctor of the apostle; and he who interprets the Psalms, doctor of the psalter. The grecian bishops still confer those sort of offices by imposition of hands, as it is practised in ordinations.

DOCTOR *of the law*, a title of honour among the Jews. The investiture, if we may so say, of this order was performed by putting a key and a table-book in their hands, which is what some authors imagine our Saviour had in view, Luke xi. 52. when speaking of the doctors of the law, he says, "Woe unto you, doctors of the law, for you have taken away the key of knowledge: you entered not in yourselves, and them that were entering you hindered." The greek text of St. Luke calls them νομικοι, and the vulgate *legis periti*: agreeably to which our english translators call them *lawyers*. The word νομικος, however, in St. Matt. is rendered by the vulgate *legis doctor*, though the english version still retains the word *lawyer*.

These jewish doctors are otherwise called rabbins. See the article RABBI.

DOCTORS COMMOMS. See COLLEGE *of civilians*.

DOCUMENT, in law, some written monument produced in proof of any thing asserted.

DODARTIA, in botany, a genus of the didynamia-angiospermia class of plants, the flower of which consists of one ringent petal, with the upper lip erect and semibifid; and the lower lip patent, twice broader than long, and trifid: the fruit is a globose bilocular capsule, containing a great number of very small seeds. See plate LXXVI. fig. 1.

DODDER, the english name of a plant, called by authors cuscuta. See the article CUSCUTA.

DODECAGON, in geometry, a regular polygon consisting of twelve equal sides and angles.

Dodecagon, in fortification, is a place surrounded by twelve bastions.

DODECAHEDRON, in geometry, one of the platonic bodies, or regular solids, contained under twelve equal and regular pentagons.

Its solidity is found by multiplying the area of one of the pantagons by 12, and then this product by $\frac{1}{3}$ of the distance of the face from the center of the dodecahedron, which is the same with the center of the circumscribing sphere.

The side of a dodecahedron, inscribed in a sphere, is the greater part of the side of a cube, inscribed in the same sphere, cut into extreme and mean proportion. If the diameter of the sphere be 1.0000, the side of the dodecahedron, inscribed in it, will be .35682 nearly.

All dodecahedrons are similar, and are to one another as the cubes of their sides; their surfaces are also similar, and therefore they are as the squares of their sides; whence as .509282 is to 10.51462, so is the square of the side of any dodecahedron to the superficies thereof; and as .3637 is to 2.78516, so is the cube of the side of any dodecahedron to the solidity of it.

DODECANDRIA, in the linnæan system of botany, a class of plants, the eleventh in

in order, comprehending all thofe with hermaphrodite flowers, and only twelve ftamina in each: fuch are agrimony, afarum, rhizophora, &c.

DODECATEMORY, an appellation given to each of the twelve figns of the zodiac, becaufe they contain a twelfth part of the zodiac apiece. See SIGN.

It is alfo applied to the twelve houfes or parts of the zodiac of the primum mobile, to diftinguifh them from the twelve figns. See the article HOUSE.

DODECATHEON, in botany, a genus of the pentandria-monogynia clafs of plants, the calyx of which is a very fmall involucrum, confifting of a great many leaves and flowers; the corolla confifts of a fingle petal, divided into five fegments: the fruit is an oval, oblong capfule, containing one cell; the feeds are numerous and fmall.

DODECUPLA DI CROME, in the italian mufic, a name given to the triple $1\frac{2}{8}$, in four of which twelve notes are required, inftead of four in common time.

DODECUPLA DI SEMI CROME, is our triple $\frac{12}{16}$, wherein there are twelve notes inftead of fixteen, in a bar of duple time.

DODO, in ornithology, a large exotic bird, fuppofed to belong to the fwan-kind, only fomewhat bigger than the common fwans: add to this, that its head is covered with a membrane refembling a hood. See plate LXXVI. fig. 2.

DODONIAN, *dodonæus*, in antiquity, an epithet given to Jupiter, becaufe he was worfhipped in a temple built in the foreft of Dodona, where was the moft famous and it is faid the moft antient oracle of all Greece. It is reported that the pigeons and the very oaks of the foreft of Dodona fpoke and delivered oracles. In the temple was a fountain, which the antient naturalifts affure us had a property of rekindling torches when newly extinguifhed. It is alfo faid to have extinguifhed lighted torches, which is no great miracle, fince plunging them into a place where the air was too denfe, or into the water, muft neceffarily have that effect.

DODRANS, in antiquity, three fourths of the as. See the article AS.

DOESBURG, a town of the United Netherlands, in the province of Guelderland, fituated on the river Yffel, about nine miles fouth of Zutphen: eaft long. 6°, and north lat. 52°.

DOFRINE MOUNTAINS, thofe which divide Sweden from Norway.

DOG, *canis*, in zoology, a genus of quadrupeds. See the article CANIS.

The dog, in its wild ftate, lives comfortably in the woods, in many parts of the eaft: it does not attack a man, but neither does it difcover any of that familiarity which we find in the tame ones; and indeed many other animals may be made as tame as the dog, by the fame kind of treatment, which has been tried on the otter with fuccefs.

Authors have mentioned a great many fpecies of this animal, as the maftiff, wolf-dog, greyhound, hound, fpaniel, water-fpaniel, bull-dog, lap-dog, &c. but all thefe are only varieties of the original wild kind, which is of a middle fize between the maftiff and greyhound.

Choofing of DOGS. In order to choofe a dog and bitch for good whelps, take care that the bitch come of a generous kind, be well proportioned, having large ribs and flanks, and likewife that the dog be of a good breed and young. Hounds for chace are to be chofen by their colours; the white with black ears and a black fpot at the fetting on of the tail, are the beft to compofe a kennel of, and of good fcent. The black hound, or the black tanned, or the liver-coloured or white; the true talbots, are the beft for the ftronger line: the grizel, whether mixed or unmixed, fo they be fhag-haired, are the beft verminers, and a couple of thefe are proper for a kennel. In fhort, take thefe marks of a good hound, that his head be of a middle proportion, rather long than round; his noftrils wide; the ears large; his back fowed; his fillet great; haunches large; thighs well truffed; ham ftraight; tail big near the reins, the reft being flender; the leg big; the fole of the foot dry, and in the form of that of a fox with large claws.

Setting DOG. See SETTING DOG.

Bite of a mad DOG, in medicine. See the article HYDROPHOBIA.

DOG, *canis*, in aftronomy. See CANIS.

DOG'S BANE, *apocynum*, in botany, a genus of the pentandria digynia clafs of plants, the corolla of which confifts of a campanulated, roundifh, fingle petal, lightly divided into five fegments, which are revolute: there is no other nectarium; the fruit is compofed of oblong, acuminated follicles, each formed of two valves and containing one cell; the feeds are numerous, very fmall, and coronated with long down.

DOG-DAYS, the fame with thofe called canicular.

nicular. See CANICULAR DAYS.

DOG-DRAW, a term in the foreft-law, ufed when a man is found drawing after a deer, by the fcent of a hound which he leads in his hand.

DOG'S FENNEL, in botany, a name by which the cotula is fometimes called. See the article COTULA.

DOG-FLY, *cynomuia*, a kind of fly fo called from its being particularly troublefome to dogs: it is not unlike that fpecies which infefts cattle.

DOG'S STONES, a fpecies of orchis, faid to be a great provocative to venery.

DOG'S TAIL, in botany, the fame with the cynofurus. See CYNOSURUS.

DOG'S TONGUE, a plant called by botanifts cynogloffum. See CYNOGLOSSUM.

DOG'S TOOTH VIOLET, *dens canis*, a plant called by Linnæus, erythronium. See the article ERYTHRONIUM.

DOG'S TOOTH SHELL, the fame with the dentalium. See DENTALIUM.

DOGADO, a dutchy of Italy, of which Venice is the capital. See VENICE.

DOGE, the chief magiftrate in the republics of Venice and Genoa.

This dignity is elective in both places: at Venice it continues for life, at Genoa it is only for two years. His title is ferenity: he is chief of the council, and mouth of the republic, he being to anfwer for her. The Venetians do not go into mourning at his death, being only the phantom of majefty, as all the authority is vefted in the republic; the doge only lends his name to the fenate; the power is diffufed through the whole body, though anfwers to foreign ambaffadors, &c. are made in the name of the doge. The money is ftruck in his name, but does not bear his arms. All the magiftrates rife and falute him when he comes into the council: but he rifes to none but foreign ambaffadors. He muft not ftir out of Venice, without leave of the counfellors, &c.

DOGGERS, in the alum-works, a poor kind of alum-ore. See ALUM.

DOGGERS is alfo a name ufed for fifhing veffels; whence, in fome of our old ftatutes, we meet with dogger-men, denoting the fifhermen of thofe veffels.

DOGGS denote iron machines for burning wood on; alfo hooks fixed in large timbers, for drawing them with horfes.

DOGMA, a principle, maxim, tenet, or fettled opinion, particularly with regard to matters of faith and philofophy.

DOGMATICAL, fomething belonging to a doctrine or opinion. A dogmatical philofopher is one who afferts things pofitively; in oppofition to fceptic, who doubts of every thing.

DOGMATISTS, *dogmatici*, a fect of antient phyficians, of which Hippocrates was the firft author. They are alfo called *logici*, logicians, from their ufing the rules of logic in fubjects of their profeffion. They laid down definitions and divifions, reducing difeafes to certain genera, and thofe genera to fpecies, and furnifhing remedies for them all; fuppofing principles, drawing conclufions, and aplying thofe principles and conclufions to particular difeafes under confideration: in which fenfe the dogmatifts ftand contradiftinguifhed from empirics and methodifts. They reject all medicinal virtues that they think not reducible to manifeft qualities: but Galen hath long ago obferved of fuch men, that they muft either deny plain matter of fact, or affign but very poor reafons and caufes of many effects they pretend to explain.

DOLE, in our antient cuftoms, fignified a part, or portion, moft commonly, of a meadow, where feveral perfons have fhares. It alfo ftill fignifies a diftribution or dealing of alms, or a liberal gift made by a great man to the people.

DOLE-FISH feems to be that fifh which the fifhermen, yearly employed in the north feas, do, of cuftom, receive for their allowance or fhares.

DOLE, in the law of Scotland, is ufed for malevolent intention.

Dole, in the law of Scotland, as well as *dolum* in the civil law, from whence it is taken, is an effential ingredient to conftitute an action criminal. In crimes wherein the will, and the event, muft be regarded, no negligence can equal dole, unlefs the negligence be fo extremely fupine as not to be conceivable without implying dole.

Under dole are comprehended the vices, and errors of the will, which are immediately productive of the criminal fact, though not premeditated, but the effect of fudden paffion. In this refpect dole differs from what the englifh law calls malice. See the article MALICE.

DOLICHOS, in botany, a genus of the diadelphia-decandria clafs of plants, the corolla of which is papilionaceous; the vexillum is roundifh, large, emarginated, and wholly reflected; the fruit is a large, acuminated, oblong pod, compofed of two valves, and containing two cells;

cells; the feeds are numerous, elliptical, and frequently compreffed.

DOLIMAN, a kind of long caffock, worn by the Turks, hanging down to the feet, with narrow fleeves buttoned at the wrift.

DOLIUM, in natural hiftory, the name of a genus of fhells, called by fome conchæ-globofæ.

The dolium is a fimple fhell, without any hinge, formed of one continuous piece, which makes a body of a figure approaching to round, diftended, and, as it were, inflated. The animal inhabiting this fhell is a limax. See the article LIMAX.

Some of thefe have the mouth dentated; others fmooth; in fome the clavicle is moderately long, though in moft it is depreffed; and the columella is in fome fpecies fmooth, in others wrinkled: thefe fhells are found on the fhores of many parts of the Eaft Indies, and are alfo frequently brought from America. See plate LXXVI. fig, 3.

DOLLAR, a filver coin current in feveral parts of Germany and Holland. There are various fpecies of dollars, as the rix-dollar, the femi-dollar, the quarter-dollar, *&c.* for each of which fee COIN.

DOLPHIN, in ichthyology, the englifh name of the delphinus, with an oblong rounded body, and a long acute roftrum. It is confiderably longer than the porpeffe: the opening of the mouth is vaftly wide, reaching on each fide to the breaft; and the fiftula, or aperture for difcharging the water, is in the middle of its head. See plate LXXVI. fig. 4.

DOLPHIN, *delphinus*, in aftronomy. See the article DELPHINUS.

DOM, or DON, a title of honour, invented and chiefly ufed by the Spaniards, fignifying fir, or lord.

This title, it feems, was firft given to Pelayo, in the beginning of the VIIIth century. In Portugal no perfon can affume the title of don, without the permiffion of the king, fince it is looked upon as a mark of honour and nobility. In France it is fometimes ufed among the religious. It is an abridgement of *domnus*, from *dominus*.

DOME, in architecture, a fpherical roof, or a roof of a fpherical form, raifed over the middle of a building, as a church, hall, pavilion, veftible, ftair-cafe, *&c.* by way of crowning.

Domes are the fame with what the Italians call cupolas, and we cuppolas: Vitruvius calls them tholi. See CUPOLA, *&c.* They are generally made round, or refembling the bell of a great clock; but there are fome inftances of fquare ones, as thofe of the Louvre. Some of them alfo are in the form of polygons, as that of the jefuit's church in the Rue St. Antoine, at Paris. Domes have commonly columns ranged around their outfides, both for the fake of ornament and fupport to the work.

DOMESDAY, or DOOMS-DAY-BOOK, a very antient record made in the time of William the Conqueror, which now remains in the exchequer, and confifts of two volumes, a greater and a lefs; the greater contains a furvey of all the lands in moft of the counties in England, and the lefs comprehends fome counties that were not then furveyed. The book of domefday was begun by five juftices, affigned for that purpofe in each county, in the year 1081, and finifhed in 1086. It was of that authority, that the Conqueror himfelf fubmitted, in fome cafes wherein he was concerned, to be determined by it. Camden calls this book the Tax-book of king William; and it was farther called Magna rolla.

There is likewife a third book of Domefday, made by command of the Conqueror; and alfo a fourth, being an abridgment of the other books.

DOMES-MEN, judges or perfons appointed to determine fuits and controverfies between parties. See DAY'S MAN.

DOMESTIC, any man who acts under another, ferving to compofe his family; in which he lives, or is fuppofed to live, as a chaplain, fecretary, *&c.* Sometimes domeftic is applied to the wife and children, but very feldom to fervants, fuch as footmen, lacqueys, porters, *&c.*

DOMESTIC, *domefticus*, in antiquity, was a particular officer in the court of Conftantinople.

According to fome, this officer was one intrufted to manage affairs of importance: others fay, the greek *domeftici* were the fame with the roman *comites*; and that they began firft to be ufed when count became a dignity; domeftics therefore were fuch as ferved the prince in the adminiftration of affairs, as well thofe of the family, as the affairs of juftice and the church.

DOMESTICUS MENSÆ, officiated as grand fenefchal, or fteward.

DOMESTICUS *rei domefticæ*, did the office of mafter of the houfhold.

DOMESTICUS

Domesticus scholarum, or Legionum, commanded the reserved forces, called scholæ palatinæ, whose office it was to put the immediate orders of the emperor in execution.

Domesticus murorum had the superintendance of all the fortifications.

Domesticus regionum was a sort of attorney, or solicitor-general, of the east and west.

Domesticus icanatorum commanded the military cohorts. There were several other officers of the army, who were called by the name Domesticus, which meant no more than their commander. There were also two *domestici chori*, or chantors, called also *protopsaltes*, belonging to the church at Constantinople; one of them was on the right side of the church, and the other on the left.

Domestici, was also a body of forces in the roman empire.

Pancirollus takes them to be the same with those called *protectores*, who had the chief guard of the emperor's person, in a degree above the prætorians, and who, under the christian emperors, had the privilege to bear the grand standard of the cross. They are supposed to have been 2500 before Justinian's time, who added 2000 more to the number. They were divided into several companies, or bands, called *scholæ*. Some whereof are said to have been instituted by Gordian: some of them were cavalry, and others infantry. Their commander was called *comes domesticorum*.

Domestic navigation, coasting, or sailing along the shore, in which the lead and compass are the chief instruments.

DOMIFYING, in astrology, the dividing or distributing the heavens into twelve houses, in order to erect a theme, or horoscope, by means of six great circles, called circles of position.

There are various ways of domifying: that of Regiomontanus, which is the most common, makes the circles of position pass through the intersections of the meridian and the horizon: others make them pass through the poles of the zodiac.

DOMINANT *of a mode*, in music, that sound which makes a perfect fifth to the final in authentic modes; and a third to the final or sixth, to the lowest chord of a plagal mode.

DOMINATION, in theology, the fourth order of angels, or blessed spirits, in the hierarchy, reckoning from the seraphim.

DOMINGO, or St. Domingo, the capital of the island of Hispaniola, the see of an archbishop, and the most antient royal audience in America: west long. 70°, north lat. 18° 20′.

DOMINI, or Anno Domini. See the article Anno.

Bull in cœno Domini. See Bull.

DOMINICA, one of the Caribbee-islands, subject to Britain: west long. 61° 20′, north lat. 16°.

DOMINICAL letter, in chronology, is that letter of the alphabet which points out in the calendar the Sundays throughout the year, thence also called *Sunday-letter*. See Calendar and Bissextile.

The distribution of days into weeks is made by the seven first letters of the alphabet, A, B, C, D, E, F, G, beginning, at the first of January, to place the letter A; to the second of January B is joined; to the third C; and so on to the seventh, where G is figured: and then again beginning with A, which is placed at the eighth day, B will be at the ninth, C, at the tenth, and so continually repeating the series of these seven letters, each day of the year has one of them in the calender. By this means the last of December has the letter A joined to it, for if the 365 days, which are in a year, be divided by seven, we shall have fifty-two weeks, and one day over. If there had been no day over, all the years would constantly begin on the same day of the week, and each day of a month would constantly have fallen on the same day of the week: but now, on account, that besides the fifty-two weeks in the year, there is one day more, it happens, that on whatever day of the week the year begins, it ends upon the same day, and the next year begins with the following day.

The letters being ranked in this order, that letter which answers to the first Sunday of January, in a common year, will shew all the Sundays throughout the year, and to whatever days in the rest of the months, that letter is put, these days are all Sundays. If the first day of January be on a Sunday, the next year will begin on Monday, and the Sunday will fall on the seventh day, to which is annexed the letter G, which therefore will be the Sunday letter for that year; the next year beginning on Tuesday,

Tuesday, the first Sunday will fall on the sixth of January, to which is adjoined the letter F, which is the Sunday letter for that year; and in the same manner, for the next following, the dominical letter will be E; and so on. By this means the Sunday letters will go on in a retrograde order, *viz.* G, F, E, D, C, B, A. But because every fourth year consists of 366 days, the series of letters will be interrupted, and the order will not return till twenty-eight years, or four times seven; and hence arises the cycle of twenty-eight years. See the article CYCLE *of the Sun.*

Thus, if in a leap year, the first of January be Sunday, and consequently the dominical letter A, the twenty-fourth day of February will fall on a Friday, and the twenty-fifth on a Saturday; and since both these days are marked in the calendar with the letter F, the following day, which is Sunday, will be marked with G, which letter will mark out all the Sundays, and consequently be the dominical letter the remaining part of the year; and hence it is that every leap year has two dominical letters, the first of which serves from the beginning of the year to the twenty-fourth or twenty-fifth day of February, and then the other takes place and serves for the rest of the year.

The intercalary day is placed between the twenty-third and twenty-fourth day of February, and so makes two twenty-fourths of February, which in the calendar are esteemed one and the same day, and have the same letter affixed to them; but by our way of reckoning, they are called the twenty-fourth and twenty-fifth days of February.

For finding the dominical letter, divide the year, and its fourth part, by seven, which will give the index of the dominical letter, reckoning 1 for A, 2 for B, 3 for C, *&c.*

Thus, if it were required to find the dominical letter for the year 1754, it will be found to be F. For, if to the given year 1754, you add its fourth part 438, the sum will be 2192, which divided by 7, the remainder will be 1, and that subtracted from 7, the index will be 6, which corresponds to the letter F.

But as the years 1800, 1900, 2100, 2200, 2300, *&c.* according to the new stile, consist of 365 days only, and therefore have but one dominical letter, whereas, according to the Julian calendar, they would have two; for this reason the dominical letters will be changed, and consequently this method of finding the dominical letter will only hold good for this century; after which a number must be added to the year, and its fourth, in order to find the dominical letter for ever: for which purpose observe the following rule.

Reject the figures or cyphers to the place of hundreds: divide the remaining figures or cyphers by 4; from this quotient subtract 1, and this number subtracted from the hundred years; and then this last remainder taken from the least number of sevens possible, leaves a number which must be added to the year and its fourth, in order to find the dominical letter: Example, what will be the dominical letter for the year 1842? This question, by the above rule, will be solved in the following manner, $18 \div 4 = 4$ from which subtracting 1; and the remainder 3 taken from 18, gives 15, which being subtracted from 21, the nearest sevens gives 6, the number to be added. Then to the given year 1842, and its fourth part 460, and the number found 6, the sum is 2308; which being divided by 7, gives 329 for the quotient, and the remainder is 5; which taken from 7, leaves 2, the index of the letter B, the dominical letter required.

DOMINICANS, an order of religious, called in France, jacobins, and in England, black fryars, or preaching fryars. This order, founded by St. Dominic, a native of Spain, was approved of by Innocent III. in 1215, and confirmed by a bull of Honorius III. in 1216. The design of their institution was, to preach the gospel, convert heretics, defend the faith, and propagate christianity. They embraced the rule of St. Augustine, to which they added statutes and constitutions, which had formerly been observed either by the Carthusians or Præmonstratenses. The principal articles enjoined perpetual silence, abstinence from flesh at all times, wearing of woollen, rigorous poverty, and several other austerities. This order has spread into all the parts of the world. It has produced a great number of martyrs, confessors, bishops; and they reckon three popes, sixty cardinals, 150 archbishops, and 800 bishops of their order, besides the masters of the sacred palace, who have always been dominicans. They are inquisitors in many places.

The

The nuns or sisters of this order, owe their foundation to St. Dominic himself, who built a monastery at Prouilles, where poor maids might be brought up and supplied with all necessaries for their subsistence. The habit of these religious was a white robe, a tawney mantle, and a black veil. Their founder obliged them to work at certain hours of the day, and particularly to spin yarn and flax to make their own linen. The nuns of this order have 130 houses in Italy, forty-five in France, fifty in Spain, fifteen in Portugal, forty in Germany, and many in Poland, Russia, and other countries. They lie on straw beds, and never eat flesh excepting in sickness; but many monasteries have mitigated this austerity.

DOMINION, *dominium*, in the civil law signifies the power to use or dispose of a thing as we please. *Dominium plenum*, is when the property is united with the possession. *Dominium nudum*, when there is the property without the possession. *Dominium* is again divided into that which is acquired by the law of nations, and that which is acquired by the civil law. The former can never be got without possession, the latter may. Another distinction of *dominium* is, into natural and civil. Natural is that which is common to all nations, or that which is acquired by the means which all nations use in acquiring estates. Civil is peculiar to the roman citizens, and consists of these three methods. Sale, prescription, cession of right. *Directum dominium*, is the right alone of dominion. *Dominium utile*, the profit redounding from it. Thus the wife retains the *dominium directum* of her jointure, and the *dominium utile* passes to her husband.

DOMINUS, in the civil law, he who possesses any thing by right of purchase, gift, loan, legacy, inheritance, payment, contract, or sentence.

DOMINUS, in the feudal law, he who grants a part of his estate in fee to be enjoyed by another.

DOMINUS, in the antient times, a title prefixed to a name, usually to denote the person either a knight or a clergyman.

DOMO REPARANDO, in law, is a writ which lies for a person against his neighbour, whose house he fears will fall to the damage of his own.

DON, the name of two rivers; one very large, which after dividing Asia from Europe, falls into the Palus Meotis; the other, in the county of Aberdeen in Scotland.

DONATION, an act whereby a person transfers to another either the property or the use of some thing, as a free gift. In order to be valid, it supposes a capacity both in the donor and donee, and requires consent, acceptance, and delivery; and, by the french law, also registry. Civilians distinguish donation into pure and conditional. *Donatio pura* is when one gives a thing with an intention that it become immediately the property of the donee, never to revert to the donor; and this from no other motive, than his generosity. *Donatio conditionalis* is when one gives a thing with an intention that it become the property of the donee, upon performing some condition stipulated.

DONATISTS, christian schismatics in Africa, who took their name from their leader Donatus. A secret hatred against Cæcilian, elected bishop of Carthage about the year 311, excited Donatus to form this sect. He accused Cæcilian of having delivered up the sacred books to the pagans, and pretended that his election was void, and all his adherents heretics. He taught that baptism administred by heretics was null, that every church but the African was become prostituted, and that he was to be the restorer of religion. Some accuse the donatists of arianism. Constantius and Honorius made laws for their banishment, and Theodosius and Honorius condemned them to grievous mulcts.

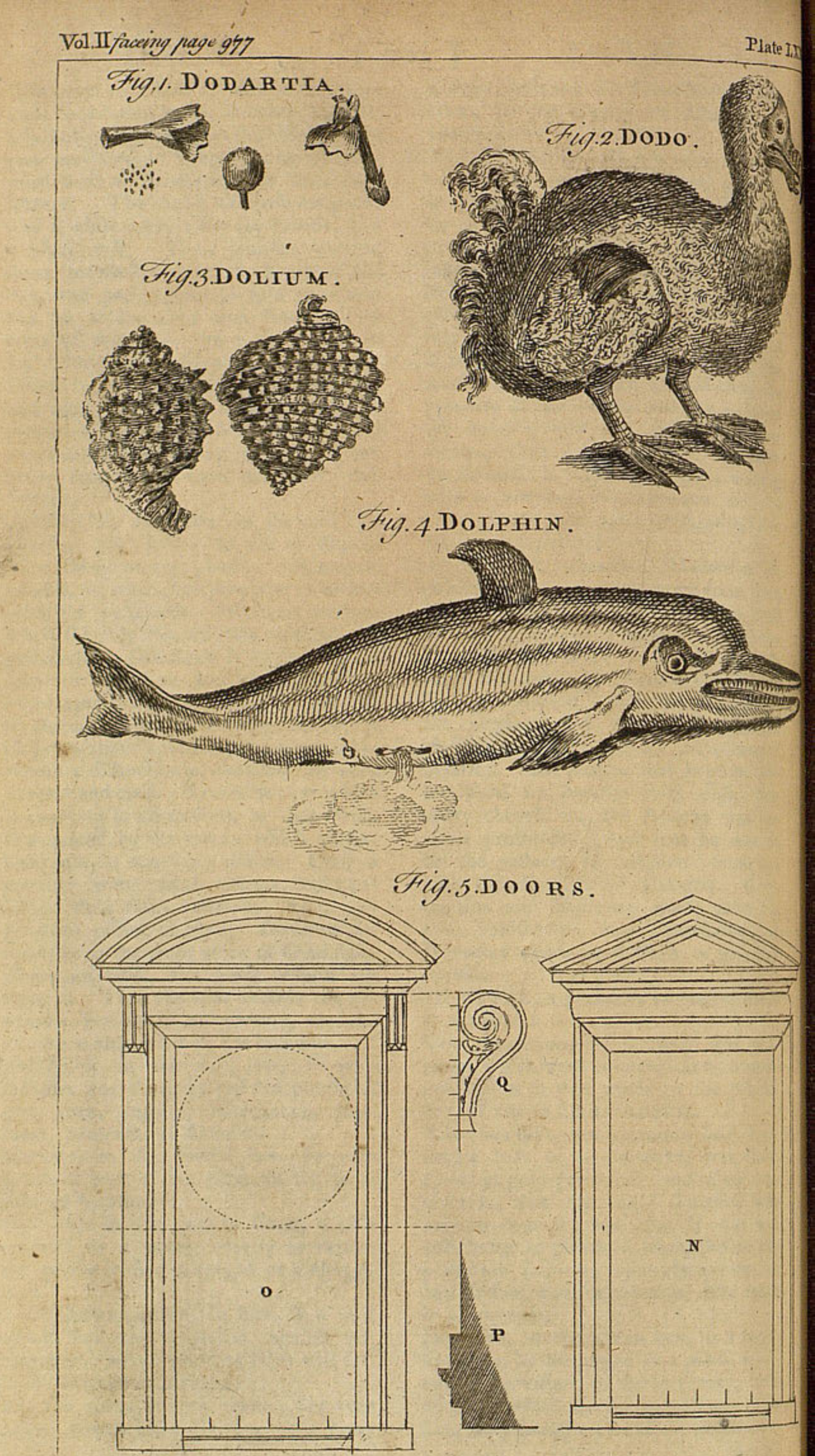
DONATIVE, a gratuity, or present made to any person.

Donative among the Romans was properly a gift made to the soldiers, as congiarium was that made to the people. See the article CONGIARIUM.

Salmasius says, the common and legitimate rate of a donative, was three pieces of gold per head; and Casaubon observes, that the legal donative was 20,000 denarii; and that it was not customary to give less, especially to the prætorian soldiers; that the centurions had double, and the tribunes, &c. more in proportion.

Donative, in the canon law, is a benefice given by the patron to a priest, without presentation to the ordinary, and without institution or induction. The king may found a church or chapel, and

exempt


Fig. 1. DODARTIA.
Fig. 2. DODO.
Fig. 3. DOLIUM.
Fig. 4. DOLPHIN.
Fig. 5. DOORS.
Q
O
P
N

T. Jefferys

exempt it from the jurisdiction of the ordinary. He may also by his letters patent grant licence to a common person to found such a church, and ordain it to be made donative. The resignation of a donative must be to the donor or patron, nor may the ordinary visit the same, but the patron by commissioners appointed by him. There can be no lapse of this benefice, though the bishop may compel such patron to nominate a clerk by ecclesiastical censures; and the clerk must be qualified as other clerks of churches are.

DONAWERT, a city of Bavaria in Germany, forty miles north-west of Ulm: east long. 10° 40′ north lat. 48° 40′.

DONCASTER, a market town of Yorkshire, thirty miles south of York.

DONEE. See the article DONOR.

DONJON, in fortification, signifies a strong tower, or redoubt of a fortress, whither the garrison may retreat, in case of necessity, and capitulate with greater advantage.

DONOR, in law, the person who gives lands or tenements to another in tail, *&c.* as he to whom such lands, *&c.* are given is the donee.

DONZY, a town of France in the Orleannois: east long. 3° 16′, north lat. 47° 17′.

DOOR, in architecture, an aperture in a wall, to give entrance and exit into and out of a building, or any apartment thereof.

It is laid down as a rule, that the doors of an house be as few in number, and as moderate in dimensions, as possible; as all openings are weakenings.

Secondly, that they do not approach too near the angles of the walls, it being a very great solecism to weaken that part which strengthens all the rest.

Thirdly, that the doors, if possible, be placed over one another, that void may be over void, and full over full, which circumstance will greatly strengthen the whole fabric.

Fourthly, that, if possible, they may be opposite to each other, in such a manner, that one may see from one end of the house to the other, which will not only be very graceful, but most convenient, in respect that it affords means of cooling the house in summer, by letting the air through it, and by keeping out the wind in winter, which way soever it sit.

Fifthly, 'tis not only ornamental, but very secure, to turn arches over doors, which will discharge them in great measure from the superincumbent weight.

The proportions of doors are adjusted by those of a man. In large buildings, they must be always larger than in smaller; but should not be less than six feet high in any, to admit a man of a just stature erect: and as the breadth of a man, with his arms placed akembo, is nearly subduple his height, the width ought never to be less than three feet. Some architects give us those dimensions following: in small buildings, the breadth of the door four feet, or four and a half; in middling buildings five, or six; in large ones seven, or eight: in chambers of the first story three and a half, three and three-fourths, or four; of the second, four, or four and a half; and of the third, five, or six; in churches seven or eight; in gates, nine, ten, or twelve: hence their height is easily determined, except for the gates of cities, which should only be four-fifths of their breadth.

In plate LXXVI. fig. 5. are represented two doors, of which that marked N is two diameters high; and that marked O, $2\frac{1}{6}$ diameters. Here the architrave being divided into three parts, two is for the breadth of the pilaster, as at P; and on these pilasters are placed the trusses, scroles, or corbels, as in Q; whose shape is almost at pleasure. If either of these be used as frontispieces of external doors, the pediment ought not to be broken, or opened, and the architrave should stand on a plinth, equal to two thirds thereof, or to the height of the step, by which one ascends into the house.

DORCHESTER, the capital of Dorsetshire, situated on the river Froom, six miles north of Weymouth: west long. 2° 35′, and north lat. 50° 40′.

It gives the title of marquis to the noble family of Pierpoint, dukes of Kingston, and sends two members to parliament.

DORDONNE, a river of France, which runs through the province of Guienne, and falls into the Garonne, twelve miles below Bourdeaux.

DOREE, or JOHN DOREE, a fish called by authors faber. See the article FABER.

DORIC, in general, any thing belonging to the Dorians, an antient people of Greece, inhabiting near mount Parnassus.

DORIC ORDER, in architecture, the second of the five orders, being that between the tuscan and ionic. See the article ORDER, TUSCAN, and IONIC.

This order seems the most natural and best proportioned of all the orders, the several parts of it being founded on the natural position of solid bodies. Accordingly, the doric is the first, and most antient of the orders of architecture, and is that which gave the first idea or notion of regular building. See plate LXXVII. fig. 1.

It was indeed more simple at its first invention, than it is at present; and when they came in after times to adorn and enrich it more, the appellation of Doric was restrained to this richer manner, and then they called the primitive, simple manner, by the new name of Tuscan.

Some time after its invention, it was reduced to the proportions, strength and beauty of the body of a man: hence as the foot of a man was judged the sixth part of his height, they made the doric column six diameters high. After that, they added another diameter to it, and made it seven, which augmentation seemed to bring it nearer to the proportion of a man, the human foot, at least in our days, not being a sixth but nearly a seventh part of the body.

The characters of the doric order, as they are now managed, are, the height of its column, which is eight diameters; the frieze which is adorned with triglyphs, drops, and metopes; its capital, which is without volutes, and its admitting of cymatiums.

It has been already observed, that the antients had two dorics; the first of which was the more simple and massive, and was chiefly used in temples; the second which was the more light and delicate, they used in porticoes and theatres.

The doric is used by the moderns, on account of its solidity, in large, strong buildings, as in the gates of cities and citadels, the outsides of churches, and other massy works, in which delicacy of ornaments would not be suitable.

The most considerable antient monuments of this order is the theatre of Marcellus at Rome, the capital, the height of the frieze, and projecture of which are much smaller than in the modern architecture.

Vignola adjusts the proportion of the doric order as follows: he divides the whole height of the order without the pedestal into twenty parts, or modules, one of which he allows to the base; fourteen to the shaft, or fust; one to the capital, and four to the entablature: the several parts and members may be seen under their respective heads. See the articles COLUMN, CORNICHE, BASE, FRIEZE, *&c.*

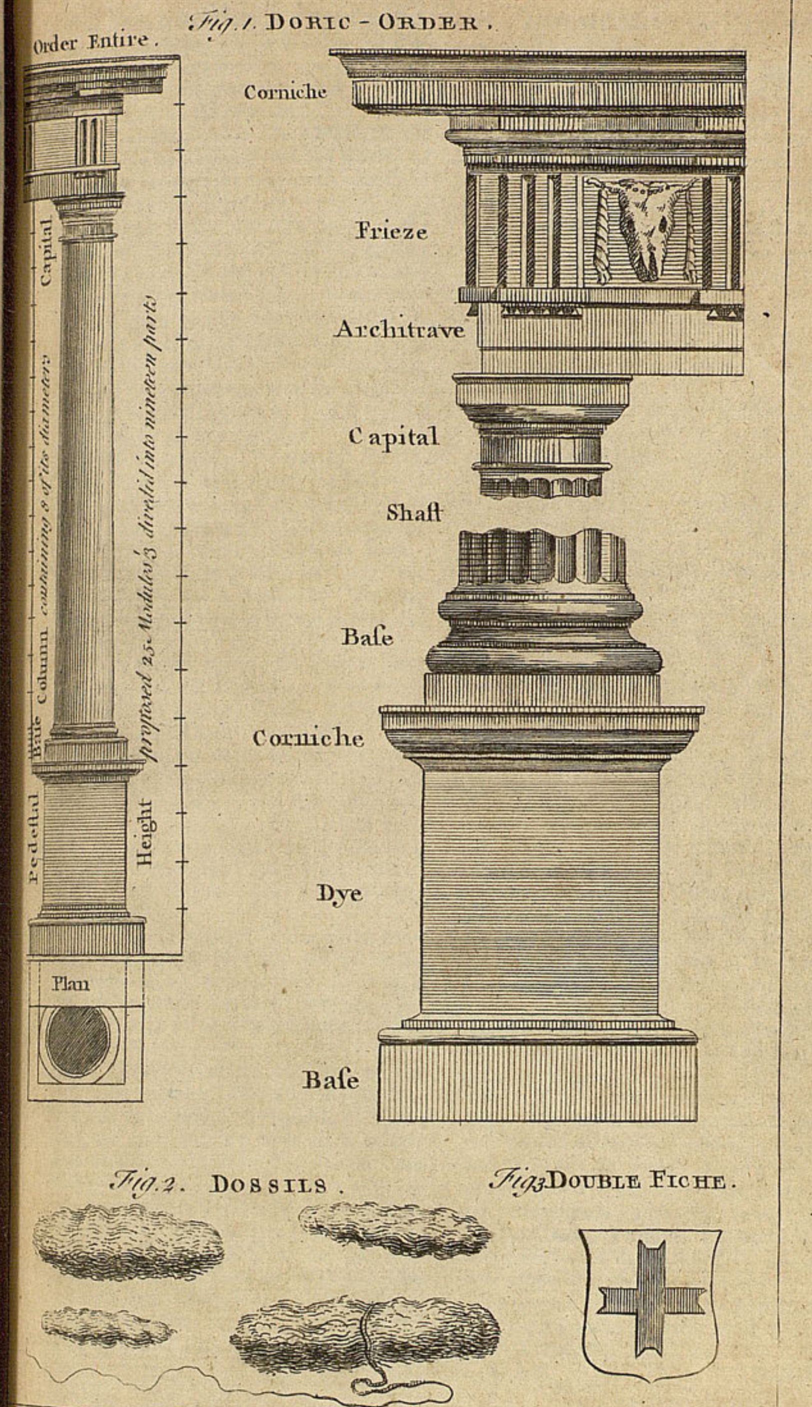
The DORIC *order delineated by equal parts, instead of modules and minutes.* The height of the pedestal being two diameters, and $\frac{1}{3}$, is divided into 4, giving one to the base, whose plinth is $\frac{1}{3}$ thereof; the other part is divided into seven, giving four to the torus, one to the fillet, and two to the hollow. The breadth of the dye is a diameter and one third. The projection of the base is equal to its height, and the fillet has 4 of these parts. The height of the corniche is half the base, being $\frac{1}{8}$ of the whole height, and is divided into nine, giving two to the hollow, one to the fillet, five to the corona, and one to the fillet: the projection of the hollow is three of these parts, of the corona six, and of the whole seven.

Base of the column. The height is half a diameter, and is divided into six, giving two to the plinth, 1 and $\frac{1}{2}$ to the lower torus, $\frac{1}{4}$ to the fillet, one to the scotia, $\frac{1}{4}$ to the fillet, and one to the upper torus. The fillet above the torus is equal to the others, and is part of the column. The projection is two of these parts, and one third thereof is for the upper fillet, and $\frac{2}{3}$ to the upper torus; and the fillet, under it, is perpendicular to the center. For forming the scotia, divide its height into 3, and on the line that separates the one part above from the other two parts below, and perpendicular to the fillet, is the center for the first quarter sweep; and the same distance forwards, in the line, is the center for the other quarter, and is also the projecture of the lower fillet.

The diminishing of this colum is $\frac{1}{5}$ of the diameter. The height of the capital is half a diameter, and is divided into 9, giving three to the frieze of the capital, one to the fillets, which are three, and are equal; two to the ovolo, two to the abacus, and one to the ogee and fillet which is $\frac{1}{3}$. For the projections, the fillets have one of these parts, the abacus three, and the whole four.

The height of the architrave is $\frac{1}{2}$ a diameter, and is divided into six parts, giving two to the first face, two to the second, one to the bells and fillet, which is one third, and one to the band at top: the projection is equal to the band.

 The



J. Jefferys Sculp.

The frieze is in height $\frac{3}{4}$ of the diameter, and the triglyphs are in breadth $\frac{1}{2}$ a diameter, which are divided into 6, giving 1 to each of the channels, and 1 to the ſpaces between the channels.

The projection from the naked of the frieze is $\frac{3}{4}$ of a part; and the ſpaces, or metopes, between the triglyphs, ought to be equal to the height of the frieze.

The height of the corniche is $\frac{3}{4}$ of the diameter, and is divided into 9, giving 1 to the cap of the triglyph, 1 to the hollow and fillet, which is $\frac{1}{6}$, 1 to the ovolo, 1 to the mutule and fillet under it, which is equal to the other; $\frac{1}{2}$ part to the cap of the mutule and fillet, which is $\frac{1}{3}$, 1 and $\frac{3}{4}$ to the corona, $\frac{3}{4}$ to the cima reverſa, $\frac{1}{4}$ to the fillet, 1 and $\frac{1}{4}$ to the cima recta, and $\frac{1}{2}$ part to the fillet.

For the projections, the cap of the triglyph hath 1 of theſe parts, the hollow 1 and $\frac{3}{4}$, the ovolo 2 and $\frac{3}{4}$, the mutule 8 and $\frac{3}{4}$, the corona 9 and $\frac{3}{4}$, the cima reverſa 10 and $\frac{3}{4}$, and the whole 12 parts.

Doric dialect, in grammar, one of the five dialects, or manners of ſpeaking which were principally in uſe among the Greeks.

It was firſt uſed by the Lacedemonians, particularly thoſe of Argos; afterwards it paſſed into Epirus, Lybia, Sicily, and the iſlands of Rhodes, Crete, *&c.*

According to the doric dialect, the vowels, η, ε, ο, ω, are changed into α; the diphthong ει into α or αι; and the conſonants β into γ; ζ into σδ; κ and ς into τ; τ and ρ into κ; λ with a τ or ϑ following it, into ν. Thus for φημη, τρεχω, κλειδας, βλεφαρα, *&c.* they ſay φαμα, τραχω, κλαδας, γλεφαρα, *&c.*

They likewiſe change ου into ω, as λογω for λογου; alſo εος into ευς, as βασιλευς for βασιλεος: εα, αε, and αει into η, as κρης for κρεας, εγελης for εγελαες, and γελης for γελαεις: with other tranſmutations of the like nature.

Doric mode, in muſic, the firſt of the authentic modes of the antients; its character is to be ſevere, tempered with gravity and joy; and is proper upon religious occaſions, as alſo to be uſed in war. It begins *D, la, ſol, re.* Plato admires the muſic of the doric mode, and judges it proper to preſerve good manners, as being maſculine; and on this account allows it in his commonwealth. The antients had likewiſe their ſub-doric or hypodoric mode, which was one of the plagal modes. Its character was to be very grave and ſolemn: it began with *re*, a fourth lower than the doric.

DORING, or Daring, among ſportſmen, a term uſed to expreſs a method of taking larks by means of a clap-net and a looking-glaſs. See the article Clap-net.

DORMANT, in heraldry, is uſed for the poſture of a lion, or any other beaſt, lying along in a ſleeping attitude, with the head on the fore-paws; by which it is diſtinguiſhed from the couchant, where, though the beaſt be lying, yet he holds up his head.

Dormant-tree, in architecture, is a name given by workmen to a great beam lying acroſs a houſe, commonly called a ſummer.

DORMER, in architecture, ſignifies a window made in the roof of an houſe, or above the entablature, being raiſed upon the rafters.

DORMITORY, a gallery in convents or religious houſes, divided into ſeveral cells, in which the religious ſleep or lodge.

Dormitory is ſometimes uſed for a burying place.

DOR-MOUSE, a ſpecies of mus with a long hairy tail, and a white throat. See the article Mus.

This is a very pretty creature, of the bigneſs of the common mouſe; the head is ſmall, and not ſharp at the ſnout, as in many ſpecies: the ears are broad and ſhort; the eyes are large, bluiſh, bright, and very prominent; the head is of a reddiſh brown, very bright and ſhining; the back is of a duſkiſh brown, with a tinge of orange-colour; the belly is of the ſame colour, but ſtill paler; we have it in our fields and gardens, and call it the dor-mouſe, or ſleeper, from its naturally ſleeping all the winter-part of the year.

DORNOCH, a royal borough, and port town, of the county of Sutherland, in Scotland, ſituated on a frith of the ſame name, oppoſite to Taine, in weſt long. 3° 53, north lat. 58°.

DORONICUM, leopard's bane, in botany, a genus of the ſyngeneſia-polygamia-ſuperflua claſs of plants, the compound flower of which is radiated: the proper flower is funnel-formed; there is no pericarpium, but the cup, being ſlightly connivent, contains a ſolitary ſeed, vertically ovated, compreſſed, ſulcated, and crowned with a downy pap.

The root of the doronicum officinarum is ſaid to be an alexipharmic, but it is not uſed in the preſent practice.

DORPT, or DORPAT, a city of Livonia, about fifty miles fouth of Narva: eaft long. 27° 25′, and north lat. 58°.

DORSAL, an appellation given to whatever belongs to the back. See the article DORSUM.

DORSAL MUSCLES are the mufcles of the back and loins, which are for the moft part common: there are of the extenfors ufually reckoned three on each fide, *viz.* the facro-lumbaris, the longiffimus dorfi, and the femifpinofus: the flexors are three alfo, *viz.* the quadratus lumborum, the pfoas parvus, and the intertranfverfales lumborum. See each under its proper head.

DORSAL NERVES. See NERVE.

DORSIFEROUS PLANTS, among botanifts, fuch as are of the capillary kind, without ftalks, and which bear their feeds on the backfide of their leaves.

DORSTENIA, in botany, a genus of the tetrandria-monogynia clafs of plants, which have no flower-petals, only a great many collections of the male and female parts on the difc; each collection, or partial flower, being furrounded by its proper perianthium, as the whole are by a common involucrum or cup; the feeds, which are roundifh and folitary, are contained in a common pulpy receptacle. See the article CONTRAYERVA.

DORSUM, BACK, in anatomy, comprehends all the pofterior part of the trunk of the body, from the neck to the buttocks.

The back is furnifhed with feveral mufcles, which are common to it with the loins, as the longiffimus dorfi, the facro-lumbaris, and femifpinofus; thefe are called extenfors. See EXTENSOR.

To the back likewife belong the intertranfverfales lumborum, the quadratus lumborum, and the pfoas. See the article INTERTRANSVERSALIS, &c.

Its bones are the fpina dorfi, ribs, and os facrum. See SPINE, RIBS, &c.

DORSUM is alfo ufed to denote the upper fide of the hand and foot, in contradiftinction to the lower fide, called the palm and fole. See HAND and FOOT.

DORSUM NASI, the ridge of the nofe. See the article NOSE.

DORT, a city of the United Provinces, fituated in that of Holland, on an ifland in the river Maefe, about ten miles eaft of Rotterdam: eaft long. 4° 40′, and north lat. 51° 47′.

DORTMOND, a city of Weftphalia in Germany, about thirty miles north-eaft of Duffeldorp: eaft longitude 6° 30′, and north latitude 51° 25′.

It is an imperial city, and conftitutes a fovereign ftate.

DORYPHORI, in antiquity, an appellation given to the life-guard men of the roman emperors: they were held in fuch great eftimation, as frequently to have the command of armies conferred on them. It was likewife ufual for the chief commanders, to have their doryphori to attend them.

DOSE, in medicine and pharmacy, the quantity of a medicine given at one time; or the proportion which the feveral ingredients of a compound medicine bear to each other.

It is the bufinefs of the phyfician to adjuft the dofes of medicines to the cafes of his patients; in doing which he cannot ufe too much caution, fince the fame dofe that would prove highly beneficial to one, may be fatal to another.

DOSITHEANS, *dofithei*, in church-hiftory, a fect among the Hebrews, being one of the branches of the Samaritans. See the article SAMARITANS.

They abftained from eating any creature that had life, and were fo fuperftitious in keeping the fabbath, that they remained in the fame place and pofture wherein that day furprifed them, without ftirring till the next day. They married but once, and a great number never married. Dofitheus, their founder, being diffatisfied among the Jews, retired to the Samaritans, who were reputed heretics, and invented another fect; and to make it more authentic, he went into a cave, where, by too long abftinence, he killed himfelf. The name of dofitheans was alfo given to fome of the difciples of Simon Magus.

DOSSER, in military matters, a fort of bafket, carried on the fhoulders of men, ufed in carrying the overplus earth from one part of a fortification to another, where it is wanted.

DOSSIL, in furgery, lint made into a cylindric form, or refembling the fhape of dates, or olive-ftones, the fize of which is very different. Doffils are ufed in dreffing a difordered part; and are fometimes fecured by a thread, tied round their middle. See plate LXXVII. fig. 2.

It requires a good deal of time and experience to acquire a proper expertnefs in making up thefe forms.

Thefe different forms of fcraped lint are ufed,

used, 1. To stop the bleeding of fresh wounds; and in large wounds they should first be dipped in some styptic liquor, or sprinkled with a styptic powder. 2. To agglutinate and heal wounds, especially if spread with some digestive ointment, or dipped in some vulnerary liquor. 3. In drying up wounds and ulcers. 4. In keeping the lips of wounds at a proper distance, that they may not unite before the bottom is well digested and healed. 5. To preserve wounds from the injuries of the air.

The dossils tied round with a thread, are chiefly used in dressing deep wounds and ulcers, that none of it may be left in them.

DOTE ASSIGNANDA, in law, a writ that formerly lay for a widow, on its being found by office, that the king's tenant was seized of lands in fee or tail at the time of his death, and that he held of the king in chief, *&c.* in which case the widow was to come into the court of chancery, and there make oath that she would not marry without the king's leave; upon which she had this writ to the escheator, to assign her dower.

DOTE *unde nihil habet*, a writ of dower which the widow may have against a person that bought land of her husband in his life-time, whereof he was seized in fee simple or fee tail, and of which she is dowable.

Recto de DOTE. See the article RECTO.

DOTTEREL, the english name of a bird called by authors morinellus. See the article MORINELLUS.

DOUAY, a fortified city of the french Netherlands, situated on the river Scarpe, about fifteen miles south of Lisle: east long. 3°, and north lat. 50° 25′.

DOUBLE ASPECT, in painting. See the article ASPECT.

DOUBLE BASTION, in fortification. See the article BASTION.

DOUBLE CAST, in husbandry, a term used by the farmers for that method of sowing that does not dispense the necessary quantity of seed for a piece of land at one bout, but requires going over every place twice.

DOUBLE DESCANT, in music. See the article DESCANT.

DOUBLE DIESIS. See DIESIS.

DOUBLE *horizontal dial*, one with a double gnomon, one of which points out the hour on the outward circle, and the other shews the hour upon the stereographic projection drawn upon it. This dial not only finds the meridian, hour, *&c.* but shews the sun's place, rising and setting, declination, amplitude, altitude, and azimuth, with many other useful propositions. See the article DIAL.

DOUBLE DANCETTE, in heraldry. See the article DANCETTE.

DOUBLE EXCENTRICITY. See the article EXCENTRICITY.

DOUBLE FEAST. See FEAST.

DOUBLE FICHY, or FICHE′, in heraldry, the denomination of a cross, when the extremity has two points, in contradistinction to fiché, where the extremity is sharpened away to one point. See plate LXXVII. fig. 3.

DOUBLE FUGUE, in music. See FUGUE.

DOUBLE LETTER, in grammar, a letter which has the force and effect of two. The Greeks have three of these, *viz.* Ζ, Ξ, Ψ; the Latins have two X and Z; and most of the modern languages have the same.

DOUBLE MEASURE. See MEASURE.

DOUBLE PEDESTAL. See PEDESTAL.

DOUBLE PLEA, in law, is where the defendant in a suit alledges two several matters in bar of the plaintiff's action, when one of them is sufficient. This is not admitted in common law. Thus when a person pleads several things, the one having no dependance upon the other, such plea is accounted double, and will not be admitted; but where the things pleaded mutually depend on each other, and the party cannot have the last plea without the first, there the whole shall be received.

DOUBLE POINT, in the higher geometry. See CURVES *of the second order.*

DOUBLE POSITION. See POSITION.

DOUBLE QUARREL, a complaint made by any clerk, or other, to the archbishop of a province, against an inferior ordinary, for delaying justice in some spiritual cause, as to give sentence, institute a clerk, or the like. It seems to be termed double quarrel, because the complaint is usually made both against the judge, and the party at whose suit justice is delayed.

DOUBLE RATIO, See DUPLE.
DOUBLE ROADS, See ROAD.
DOUBLE TENAILLE, See TENAILLE.
DOUBLE TIME, See TIME.
DOUBLE VAULT, See VAULT.

DOUBLE VESSEL, in chemistry, is when the neck of one bolt-head or matrass is put and well luted into the neck of another, in order to refine and exalt spirits as high as can be. It is sometimes called a pelican, and also a diota.

DOUBLETS, a game on dice within tables;

tables: the men, which are only fifteen, being placed thus; upon the sice, cinque, and quater points, there stand three men a-piece; and upon the trey, duce, and ace, only two. He that throws highest hath the benefit of throwing first, and what he throws he lays down, and so doth the other: what the one throws, and hath not, the other lays down for him, but to his own account; and thus they do till all the men are down, and then they bear. He that is down first bears first, and will doubtless win the game, if the other throws not doublets to overtake him; which he is sure to do, since he advances or bears as many as the doublets make, *viz.* eight for two fours.

DOUBLING, in the military art, is the putting two ranks or files of soldiers into one. Thus, when the word of command is, *double your ranks*, the second, fourth, and sixth ranks march into the first, third, and fifth, so that the six ranks are reduced to three, and the intervals between the ranks become double what they were before. *To double by half files*, is when the fourth, fifth, and sixth ranks march up to double the first, second, and third, or the contrary. *To double the files to the right*, is when every other file faces to the right, and marches into the next file to it, so that the six ranks are turned into twelve, and every file is twelve deep. *To double the files to the left*, is when every other file faces to the left, and marches into the next. In doubling the files, the distance betwixt the files becomes double.

DOUBLING, among hunters, who say that a hare doubles, when she keeps in plain fields, and winds about to deceive the hounds.

DOUBLING, in the manege, a term used of a horse, who is said to double his reins, when he leaps several times together, to throw his rider: thus we say, the ramingue doubles his reins, and makes pontlevis.

DOUBLING *a cape or point*, in navigation, signifies the coming up with it, passing by it, and leaving it behind the ship.

DOUBLING, in heraldry, the linings of robes and mantles of state, or of the mantlings in atchievements.

DOUBLON, or DOUBLOON, a spanish and portuguese coin, being the double of a pistole. See COIN and PISTOLE.

DOUBTINNG, *dubitatio*, the act of with-holding our assent from any proposition, on suspicion that we are not thoroughly apprised of the merits thereof; or from not being able peremptorily to decide between the reasons for and against it.

Doubting is distinguished by the school-men into two kinds, dubitatio sterilis, and dubitatio efficax: the former is that where no determination ensues; in this manner the sceptics and academics doubt, who with-hold their assent from every thing. See SCEPTICISM, &c.

The latter is followed by judgment, which distinguishes truth from falshood: such is the doubting of the peripatetics and cartesians; the last in particular are perpetually inculcating the deceitfulness of our senses, and tell us that we are to doubt of every one of their reports, till they have been examined and confirmed by reason. On the other hand, the epicureans teach that our senses always tell truth, and that, if you go ever so little from them, you come within the province of doubting. See the articles CARTESIANS, EPICUREAN PHILOSOPHY, &c.

DOUBTING, in rhetoric, signifies the debate of the mind with itself, upon a pressing difficulty. It is, for the most part, expressed by interrogation, though that is not necessary. Thus Cicero for Roscius: "Quid primum querar? aut unde potissimum, judices, ordear? aut quod, "aut a quibus, auxilium petam? deorum immortalium? populine romani?" &c. This figure keeps us in eager attention.

DOUCINE, in architecture, a moulding concave above and convex below, serving commonly as a cymatium to a delicate corniche. It is likewise called gula. See CYMATIUM and GULA.

DOUCKER, or DUCKER. See DUCKER.

DOVE, *columba*, in ornithology. See the article COLUMBA.

DOVE, in geography, the name of a river dividing Derbyshire from Staffordshire: also of a town of the Orleanois, in France, about twenty miles south-east of Angers.

DOVE-TAILING, in carpentry, is the manner of fastening boards together by letting one piece into another, in the form of the tail of a dove. The dove-tail is the strongest of the assemblages or jointings, because the tenon, or piece of wood which is put into the other, goes widening to the extreme, so that it cannot be drawn out again, by reason the extreme or tip is bigger than the hole.

The French call it queue d'aronde; which name is also used by the English in fortification.

DOVELLA, in ichthyology, a species of labrus

labrus with two large teeth in the upper jaw. See the article LABRUS.

DOVER, a borough and port-town of Kent, situated on a rock, oppofite to Calais in France, with a ftrong caftle: eaft long. 25′, and north lat. 51° 10′.

Dover gives the title of duke to the dukes of Queenfbury, a branch of the noble family of Douglas; and fends two members to parliament, ftyled barons of the cinque-ports, whereof Dover is the chief. See the article CINQUE PORTS.

DOUGLAS, a port-town, and the beft harbour in the Ifle of Man: weft long. 4° 25′, and north lat. 54° 7′.

DOULEIA, in grecian antiquity, a kind of punifhment among the Athenians, by which the criminal was reduced to the condition of a flave.

It never was inflicted but upon the ἄτιμοι, fojourners, and freed fervants.

DOWAGER, *dotiffa*, a widow endowed, is a title applied to the widows of princes, dukes, earls, and perfons of high rank only.

DOWER, that portion which the law allows a widow out of the lands of her hufband, after his deceafe. It is diftinguifhed into five kinds: 1. Dower by the common law, is a third part of fuch lands and tenements as the hufband was folely feized in fee or tail, during the coverture, and this the widow is to enjoy during her life. 2. Dower by cuftom, that part of the hufband's eftate to which the widow is intitled, after the death of her hufband, by the cuftom of fome manor, fo long as fhe fhall live fingle and chafte: this is, fometimes more than one third part, for in fome places fhe has half the land, and in others the whole, during life. See the article *Free* BENCH. 3. Dower ad oftium ecclefiæ, formerly made by the hufband immediately after the marriage, when the particular lands were exprefly named, of which his wife fhould be endowed. 4. Dower ex affenfu patris, made of lands named by a fon who was hufband with the confent of his father; and this was always reduced into writing, as foon as the fon was married. 5. Dower de la plus belle, which was where the wife was endowed with the faireft part of the hufband's eftate. Of thefe five the two firft only of thefe writs of dower are now in ufe.

Admeafurement of DOWER. See the article ADMEASUREMENT.

Affignment of DOWER, the fetting out a woman's marriage-portion by the heir.

DOWLE-STONES, in our old writers, the fame with land-marks.

DOWN, in geography, the capital of a county of the fame name in the province of Ulfter, in Ireland: weft longitude 5° 50′, and north latitude 54° 23′.

DOWNETON, or DUNKTON, a borough-town of Wiltfhire, five miles fouth of Salifbury.

It fends two members to parliament.

DOWNHAM, a market-town of Norfolk, ten miles fouth of Lynn, famous for its good butter; there being a thoufand, and fometimes two thoufand firkins brought here every Monday, and fent up the river Oufe to Cambridge, from whence it is conveyed to London, in the Cambridge waggons.

DOWNS, a famous road near Deal, in Kent, where both the outward and homeward bound fhips frequently make fome ftay; and fquadrons of men of war rendezvous in time of war.

It affords excellent anchorage, and is defended by the caftles of Deal, Dover, and Sandwich.

DOWRY, *dos*, is properly the money or fortune which the wife brings her hufband in marriage: it is otherwife called *maritagium*, marriage-goods, and differs from dower. See the article DOWER.

Among the Germans it was cuftomary, in former times, for the hufband to bring a dowry to his wife.

DOWRY is alfo ufed, in a monaftic fenfe, for a fum of money given along with a maid, upon entering her in fome religious order.

In France, the dowry of perfons entering a monaftery, to make profeffion of a religious life, is limited by law. That given upon entering a monaftery of carmelites, urfelines, and others not regularly founded, but eftablifhed fince the year 1600, by letters patent, muft not exceed the fum of 8000 livers in towns where parliaments are held; not 6000, in other places.

DOXOLOGY, an hymn ufed in praife of the Almighty, diftinguifhed by the title of greater and leffer.

The leffer doxology was antiently only a fingle fentence, without refponfe, running in thefe words, *glory be to the Father, and to the Son, and to the Holy Ghoft, world without end, amen.* Part of the latter claufe, *as it was in the beginning, is now, and ever fhall be*, was inferted fome time after the firft compofition. Some read this antient hymn, *glory be to the*

the Father, and to the Son with the Holy Ghost. Others, *glory be to the Father in or by the Son, and by the Holy Ghost.* This difference of expreſſion occaſioned no diſputes in the church, till the riſe of the arian hereſy; but when the followers of Arius began to make uſe of the latter, as a diſtinguiſhing character of their party, it was intirely laid aſide by the catholics, and the uſe of it was enough to bring any one under ſuſpicion of heterodoxy. The doxology was uſed at the cloſe of every ſolemn office. The weſtern church repeated it at the end of every pſalm, and the eaſtern church at the end of the laſt pſalm. Many of their prayers were alſo concluded with it, particularly the ſolemn thankſgiving, or conſecration prayer at the euchariſt. It was alſo the ordinary concluſion of their ſermons.

The greater doxology, or angelical hymn, was likewiſe of great note in the antient church. It began with theſe words, which the angels ſung at our Saviour's birth, *glory be to God on high*, &c. It was chiefly uſed in the communion ſervice, and in men's private devotions. In the mozarabic liturgy, it is appointed to be ſung before the leſſons on chriſtmas day; and St. Chryſoſtom obſerves, that the aſcetics met together daily to ſing this hymn. Both the doxologies have a place in the church of England, the former being repeated after every pſalm, and the latter uſed in the communion ſervice.

DRABA, ARABIAN MUSTARD, or TURKY CRESSES, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, the flower of which conſiſts of four oblong petals, and is cruciform: it has ſix ſtamina, four whereof are longer than the other two: the fruit a bilocular, elliptico-oblong, compreſſed pod, containing a number of ſmall roundiſh ſeeds, and wanting a ſtyle.

DRABLER, in the ſea-language, a ſmall ſail in a ſhip, being the ſame to a bonnet that a bonnet is to a courſe, and is only uſed when the courſe and bonnet are too ſhoal to cloth the maſt. See the articles COURSE and BONNET.

DRABS, in the ſalt-works, a kind of wooden boxes for holding the ſalt when taken out of the boiling pan, the bottoms of which are made ſhelving or inclining forwards, that the briny moiſture of the ſalt may drain off. See the article SALT.

DRACHM, a grecian coin of the value of ſeven pence three farthings. See COIN. This was alſo the name of a kind of weight, conſiſting of three ſcruples, and each ſcruple of two oboli. As to the proportion that the drachm of the Greeks bore with the ounce of the Romans, Q. Remnius, in his poem of weights and meaſures, makes the drachm the eighth part of an ounce, not much different from the crown of the Arabians, which weighs ſomething more than the drachm.

DRACHM, is alſo a weight, uſed at preſent by phyſicians, containing ſixty grains, or the eighth part of an ounce.

DRACO, the DRAGON, in zoology. See the article DRAGON.

DRACO MARINUS, the SEA-DRAGON, in ichthyology, the ſame with the araneus of Pliny: it is a ſpecies of trachinus, growing to ſix or eight inches in length, and called by ſome the weaver. See plate LXXIX. fig. 1.

DRACO VOLANS, in meteorology, a fiery exhalation, frequent in marſhy and cold countries.

It is moſt common in ſummer, and tho' principally ſeen playing near the banks of rivers, or in boggy places, yet ſometimes mounts up to a conſiderable height in the air, to the no ſmall terror of the amazed beholders; its appearance being that of an oblong, ſometimes roundiſh, fiery body, with a long tail. It is entirely harmleſs, frequently ſticking to the hands and cloaths of people without injuring them in the leaſt.

DRACO, in aſtronomy, a conſtellation of the northern hemiſphere, ſaid by different authors to contain 31, 32, 33, or even 49 ſtars.

DRACOCEPHALUM, DRAGON'S HEAD, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, the corolla of which conſiſts of a ſingle ringent petal; the tube is of the length of the cup; the upper lip is fornicated and obtuſe, the lower is lightly divided into three ſegments; there is no pericarpium, but the cup cheriſhes the ſeeds, which are four ovato-oblong, and three ſided ones. See plate LXXIX. fig. 3.

DRACONARIUS, in antiquity, the perſon who carried the ſtandards called dragons, from the figures of theſe animals painted on them. Theſe were in uſe among the Perſians, Parthians, Scythians, Romans, &c.

DRACONTIC MONTH, the time of one revolution of the moon, from her aſcending node, called caput draconis, to her return thither.

DRACONTIUM, DRAGONS, in botany, a genus of the gynandria-polyandria claſs

clafs of plants, the corolla of which confifts of five concave, ovated, obtufe, and almoft equal petals: the fruit is a fingle roundifh berry; and the feeds are numerous.

Its root is efteemed a good alexipharmic and fudorific, and accordingly prefcribed in the plague and malignant fevers, and for the bites of ferpents.

DRACUNCULI, in medicine, fmall long worms, which breed in the mufcular parts of the arms and legs, called Guinea-worms.

This diftemper is very common in Guinea, and principally among the natives: Kempfer found it fo alfo at Ormuz, upon the perfian gulph, and likewife in Tartary. Dr. Towne, in his treatife of the difeafes of the Weft-Indies, informs us, that this diftemper is not fo frequent any where as on the Gold coaft, at Anamboe, and Cormantyn.

The worm is white, round, and uniform, very much refembling white, round tape, or bobbing. It is lodged between the interftices and membranes of the mufcles, where it infinuates itfelf fometimes exceeding five ells in length. It occafions no great pain at the beginning, but at fuch times as it is ready to make its exit, the part adjoining to the extremity of the worm, where it attempts its exclufion, begins to fwell, throb, and be inflamed: this generally happens about the ancle, leg, or thigh, and rarely higher.

The countries where this diftemper prevails, are very hot and fultry, liable to great droughts, and the inhabitants make ufe of ftagnating and corrupted water, in which it is very probable that the ova of thefe animalcula may be contained; for the white people who drink this water, are obnoxious to the difeafe as well as the negroes.

The furgeons feldom attempt to extract this worm by making an incifion; but as foon as they perceive the tumor rife to a competent bulk, they endeavour to bring it to a fuppuration, with all convenient expedition; and then the head of the worm difcovers itfelf, which they fecure, by tying it to a bit of ftick, or cotton, that it may not draw itfelf up again: thus they continue to roll it round the ftick, fometimes one inch, fometimes two or more, each day, taking great care not to break the worm, elfe it will be very difficult to recover the end of it again; and an abfcefs will be formed, not only at the fuppurated part, but likewife through the whole winding of the mufcles, where the dead putrifying worm remains, which generally occafions very obftinate ulcers. During the extraction of the worm, the patient fhould be plied with bitter aloetic and other anthelmintic medicines, in order to diflodge the worm the fooner from his tenement. When the worm is totally extracted, the remaining ulcer may be treated in the fame manner as other common ulcers; nor does any farther inconvenience remain in the parts of which it had poffeffion. This difeafe, fimply confidered, very rarely, if ever, proves mortal.

DRACUNCULI is alfo ufed for a difeafe in children, arifing from little worms called by that name. See the article WORMS.

DRACUNCULUS, the little SEA-DRAGON, in ichthyology, a fpecies of cottus, with the fecond back-fin white. See the article COTTUS.

The dracunculus is a very fingular fifh, growing to five or fix inches in length. See plate LXXIX. fig. 2.

DRAGOMAN, DROGMAN, or DRUGGERMAN, a name given in the Levant to the interpreters kept by the ambaffadors of chriftian nations, refiding at the Porte, to affift them in treating of their mafter's affairs.

DRAGON, *draco*, in zoology, an animal called alfo the flying lizard, being furnifhed with two lateral, membranaceous, and radiated wings: it is a true lizard, with a naked and four-legged body, and a long tail; though there are not wanting fome who deny the exiftence of any fuch animal. See Plate LXXX. fig. 2.

Sea DRAGON. See DRACO MARINUS, and DRACUNCULUS, *fupra*.

DRAGON'S BELLY, in aftronomy. See the article VENTER DRACONIS.

DRAGON'S BLOOD, *fanguis draconis*, in pharmacy, a moderately heavy refin, of which there are two kinds: the one firm and compact, brought to us in lumps, of an inch long, or more, and about half an inch in diameter: thefe are wrapped up in certain long and narow leaves, and are called the drops, or tears, of dragon's blood. The other is brought to us in larger maffes or cakes, of an irregular figure. This is lefs compact than the former, and lefs pure: it is called the common dragon's blood, and is greatly inferior to the former in value. Befides thefe two common kinds, we fometimes meet with a third, which is foft, and will take an impreffion from the finger; but we are to avoid a counterfeit fort of dragon's

dragon's blood that is ſometimes offered to ſale, and is made up of ſeveral different reſinous matters, coloured with the dragon's blood, or with braſil-wood: this is of no value. The dragon's blood in drops, is to be preferred to any other: the genuine dragon's blood is the fruit of a tall tree of the palm-kind, common in the iſland of Java, and ſome other parts of the Eaſt-Indies. It is a very powerful aſtringent, incraſſant, and drier. It is given in diarrhœas, dyſenteries, and hæmorrhages of all kinds; and, externally, in drying and healing ulcers. Its doſe is from five grains to twenty-five.

DRAGON-FLY, the engliſh name of the libella. See the article LIBELLA.

DRAGON'S HEAD and TAIL, the two nodes of the moon. See the article NODE.

DRAGON SHELL, the engliſh name of a ſpecies of concamerated patella, with its roſtrum very much bent. See PATELLA.

DRAGONS, in botany. See the article DRACONTIUM.

DRAGONNE'E, in heraldry. A lion dragonnée is where the upper half reſembles a lion, the other half going off like the hinder part of a dragon. The ſame may be ſaid of any other beaſt as well as a lion.

DRAGOON, in military affairs, a muſqueteer, mounted on horſeback, who ſometimes fights or marches on foot, as occaſion requires.

Dragoons are divided into brigades, as the cavalry, and each regiment into troops; each troop having a captain, lieutenant, cornet, quarter-maſter, two ſerjeants, three corporals, and two drums. Some regiments have hautboys: they are very uſeful on any expedition that requires diſpatch, for they can keep pace with the cavalry, and do the duty of infantry: they encamp generally on the wings of the army, or at the paſſes leading to the camp; and ſometimes they are brought to cover the general's quarters: they do duty on the generals of horſe and dragoons, and march in the front and rear of the army.

DRAGOON, in ornithology, the name of a ſmall kind of carrier-pigeon, called columba tabellaria minima, by Moore. It is a baſtard breed between the two ſpecies of pigeons called the horſeman and the tumbler. They are very good breeders, and as they are lighter than the horſeman, they are ſuppoſed more expeditious in flight, for a few miles: but the horſeman outdoes them at greater lengths.

DRAGS, in the ſea-language, are whatever hangs over the ſhip in the ſea, as ſhirts, coats, or the like; and boats, when towed, or whatever elſe that, after this manner, may hinder the ſhip's way when ſhe ſails, are called drags.

DRAINING *of lands*, the freeing them from an over abundance of water, by means of drains. See the next article.

DRAINS, a name given, in the fen-countries, to certain large cuts or ditches, of twenty, thirty, nay, ſometimes forty feet wide, carried, thro' the marſhy ground, to ſome river, or other place, capable of diſcharging the water they carry out of the fen-lands.

The beſt way is to begin the drain at the loweſt place, and ſo to carry it into the bog towards the ſpring-head; where it will be proper to make croſs trenches, in order to drain it thoroughly. If the drains are deep, ſo that there is danger of cattle falling into them, they may be partly filled with ſtones, brick-bats, and the like; and covered with wood, flags, turf, &c. and the water will drain away through the ſtones. When the drains are left open, the earth ſhould not be laid in heaps by their ſides, as is too often done; but ſpread over the low places near them, or even carried off in carts. See the articles DITCH and FEN.

Moſt of theſe drains are made in our fen-countries by a body of men called the undertakers, whoſe reward is one third of the ground they drain: they erect ſluices alſo at a great expence, often not leſs than two thouſand pounds each; yet theſe, with all the care they employ in erecting them, are ſubject to be blown up by the vaſt weight of water that lies on them when the lands are overflown: ſome of theſe ſluices have too or more pair of doors, of ſix, eight, or ten feet high, which ſhut, when the water in the river is higher than in the drains, by the weight and force of it, and ſo, *e contra*, throw out a body of eight feet ſquare of water, for about ſix or ſeven hours, during the ebb.

The real uſe of theſe drains is very evident from the viſible improvement of the lands where they have been cut. The inhabitants of Eſſex have a particular way of draining lands in ſuch grounds as lie below the high-water and ſomewhat above the low-water mark, and have land floods or fleets running through them, which make a kind of ſmall creek. When theſe grounds are firſt encloſed from the ſea, it is done with a bank raiſed

ed from one fide of the land defigned to be taken in to the other, except a fpace left where the creek or land-floods run into the fea. When they begin to ftop this, it is done at once, with a ftrong firm head; only according to the quantity of water to be vented, they lay therein feveral fquare troughs, compofed of four large planks, of the fame length that they defign the thicknefs of the head to be; and towards the fea is fitted a fmall door, which opens when the frefh water bears out on it, and fhuts when the falt water rifes, as already defcribed. See SLUICE.

DRAKE, in ornithology, the male of the duck-kind. See ANAS and DUCK.

DRAM, or DRACHM, in commerce, a fmall weight. See the article DRACHM and WEIGHT.

DRAMA, a poem containing fome certain action, and reprefenting a true picture of human life, for the delight and improvement of mankind.

The principal fpecies of the drama are two, comedy and tragedy. Some others there are of lefs note, as paftoral, fatire, tragi-comedy, opera, *&c.* See the articles TRAGEDY, COMEDY, *&c.*

The primary parts of the drama, as divided by the antients, are the protafis, epitafis, cataftafis, and cataftrophe. The fecondary parts are the acts and fcenes. The acceffary parts are the prologue, chorus, mimus, and epilogue, which pointed out the ufe of the piece, or conveyed fome other notice to the audience in the poet's name. See the articles PROTASIS, PROLOGUE, CHORUS, *&c.*

The drama, fays Voffius, owes its rife to the days of feftivity; for in antient times, it was ufual for men, when they gathered in the fruits of the earth, to meet together that they might facrifice to the deity, and unbend their minds from the fatigues of the harveft. Hence arofe two forts of poetry, the one grave, in praife of the gods, the other jocofe and full of lampoon, againft one another. Thus, from the former arofe tragedy, and from the latter, fatire, comedy, and mimickry.

The drama, in fome circumftances, is fuperior to epic poetry, particularly in action; for in the drama, the perfons themfelves are introduced, every thing is tranfacted in our fight, and our eyes and ears at once are gratified. Befides, the action in the drama, is much more compendious than in the epic; it takes up lefs time, and therefore requires more art to conduct it. It excites in the mind more rapid commotions, and confequently makes the pleafure and admiration more intenfe. For which reafon, Ariftotle gives the preference to the drama; not that he reckons it more noble in general than the epic, for that would be contrary to truth and reafon, but only as far as its fphere extends.

According to the Abbe du Bos, tragic poets ought to place their fcenes in times remote from that in which they live; but comedy, on the contrary, ought to be fixed in the very places and times in which it is reprefented; its defign being to make us laugh at the expence of ridiculous perfons, in order to purge us of thofe faults it expofes. Now we cannot diftinguifh nature fo eafily, when fhe appears in ftrange cuftoms, manners, and apparel, as when fhe is clad, as it were, after our own fafhion; whereas we always diftinguifh human nature in the heroes of tragedies, whether their fcenes be at Rome or Sparta, by reafon only great virtues or great vices are there reprefented.

The dramatic poetry of the Romans, was at firft divided into three forts, tragedy, fatire, and comedy; which were afterwards fubdivided into feveral fpecies. They had two fpecies of tragedies, *viz.* the tragœdiæ palliatæ, in which the perfonages, manners, and drefs were entirely greek; and the tragœdiæ prætextatæ, or prætextæ, wherein the perfonages and manners were roman. The fatire was a kind of paftoral poetry, which fome authors affert to have held a kind of middle rank between tragedy and comedy; which is almoft all we know of it. Comedy, in like manner as tragedy, was divided firft into two fpecies, *viz.* the greek, or palliata; and the roman or togata, by reafon of the introducing plain citizens into the latter, whofe drefs was called toga.

The roman comedy was again fubdivided into four fpecies; the togata, properly fo called, the tabernaria, the attellana, and the mimus. Pieces of the firft fort were very ferious, and admitted even of perfons of diftinction, for which reafon they were fometimes called pretextatæ. The fecond were comedies of a lefs ferious nature; and took their name from taberna; which ftrictly fignified a place of rendezvous, proper for affembling perfons of different conditions, whofe characters were played off in thofe pieces. The attellana was a kind of piece very like the italian comedies; that is, thofe whofe dialogues are not written. The actor,

actor, therefore, of the attellanæ, performed his part just as he pleased. The mimus resembled our farces, and the actors thereof performed always bare-foot: whereas, in tragedy, they wore a sort of shoe, or boot, called cothurnus; and, in the other species of comedy, another kind called soccus.

For the laws of the drama, see the articles UNITY, ACTION, CHARACTER, FABLE, &c.

DRAMATIC, in poetry, an epithet given to pieces written for the stage. See the article DRAMA.

Stylo-DRAMATICO, in the italian music. See the article STYLE.

DRANK, among farmers, a term used to denote wild oats, which never fail to infest worn-out lands; so that when plowed lands run to these weeds and thistles, the farmer knows it is high time to fallow them, or else to sow them with hay-seed, and make pasture of them. Some, indeed, destroy the drank, by sowing the lands with beans, and letting loose sheep upon them when young. This must be done in dry weather, and the sheep eat up the drank and other weeds, without touching the beans.

DRAPERY, in sculpture and painting, signifies the representation of the clothing of human figures, and also hangings, tapestry, curtains, and most other things that are not carnations or landscapes.

The art of drapery consists, 1. In the order of the folds or plaits, which ought to be so managed, that you may easily perceive what it is they cover, and distinguish it from any thing else. Again, the folds ought to be large, as breaking and dividing the sight the less; and there should be a contrast between them, otherwise the drapery will be stiff. 2. In the quality of the stuffs; for some make their folds abrupt and harsh, others more soft and easy: the surface of some have a lustre, others are flat and dead; some are fine and transparent, others firm and solid. 3. In the variety of colours, which, when well managed, makes the greatest beauty of painting; all not being equally amicable and friendly with respect to each other, and some never to be placed near certain others.

M. De Piles observes, that drapery must never be made to adhere to the parts of the body; that a great motion and lightness of the drapery are only proper in figures in great agitation, or exposed to the wind; and that the nudities of the figures should always be designed, before the painter proceeds to the draperies. Observe the following directions. Draw the out-lines of garments lightly, beginning with the great folds, which you may afterwards stroke into lesser; but be sure they cross not one another. Make the drapery bend with the body, according as it stands in or out, straight or crooked, or turns one way or another; observing that the closer the garment fits on the body, the narrower and smaller must the folds be. All the folds must consist of two lines, and no more, which you may turn with the garment at pleasure, shadowing the inner deep, and the outermost more light; and if the folds be never so curiously contrived, spare not to shadow them, if they fall inward from the light, with a double or triple shadow, as the occasion requires. The out-lines must be continued through the whole garment; the lesser you may break off and shorten as you please. The shades in silk and fine linen, require little folds, and a light and rare shadow; and so also fine drapery requires more and sharper folds than coarse. Observe the motion of the wind and air for drawing loose apparel all one way; and examine the nature and disposition of light, especially as it has relation to the sun or any bright body. Moreover, the plaits and folds must have their motions according as they are managed by the wearer, as under the arm, and under the knee, by opening and stretching out the arm and leg, making always hard, stiff, and gross folds, that by their appearance the nature and quality of the garment may be known, &c. But mean motions, such as appear in the folds of stuff and other cloths of fine wool, may become pliable to a person's limbs, and so made not only into sweet and pleasant folds, but may follow the bare flesh very well, falling pliably about the loins or any other part. In other kinds of mixt motions, called turnings or crossings, which are proper unto damasks, cloths of gold, &c. the folds crossing and breaking one another, appear from the various qualities of the drapery, and must be so performed, as not to favour of an over-affected imitation, without grace or order.

DRASTIC, in physic, an epithet bestowed on such medicines as are of present efficacy, and potent in operations; and is commonly applied to emetics and cathartics.

DRAVE, a large navigable river, which, taking its rise in the archbishopric of Saltz-

Saltzburg, in Germany, runs south-east through Stiria; and continuing its course, divides Hungary from Sclavonia, and falls into the Danube at Esseck.

DRAUGHT, or DRAFT, in architecture, the figure of an intended building, described on paper, in which is laid down, by scale and compasses, the several divisions and partitions of the apartments, rooms, doors, passages, &c. in their due proportion to the whole building.

It is customary, and also exceedingly convenient, for any person, before he begins to erect a building, to have designs or draughts drawn upon paper or vellum, wherein the ichnography or ground-plot of every floor or story is delineated; as also the form or fashion of each front, with the windows, doors, ornaments, in an orthography, or upright. Sometimes the several fronts, &c. are taken and represented in the same draught, to shew the effect of the whole building, which is called scenography, or perspective. See the article SCENOGRAPHY.

DRAUGHT-COMPASSES, are such as have moveable points, to draw fine draughts in architecture. See COMPASSES.

DRAUGHT, in medicine. See POTION.

DRAUGHT, in painting. See the articles DESIGN and DRAWING.

DRAUGHT, in trade, called also CLOFF or CLOUGH, is a small allowance on weighable goods, made by the king to the importer, or by the seller to the buyer, that the weight may hold out when the goods are weighed again.

The king allows 1 lb draught for goods weighing no less than 1 Cwt. 2 lb for goods weighing between 1 and 2 Cwt. 3 lb for goods weighing between 2 and 3 Cwt. 4 lb from 3 to 10 Cwt. 7 lb from 10 to 18 Cwt. 9 lb from 18 to 30, or upwards.

DRAUGHT-HOOKS, are large hooks of iron, fixed on the cheeks of a cannon-carriage, two on each side, one near the trunnion hole, and the other at the train, distinguished by the name of fore and hind draught-hooks. Large guns have draught-hooks near the middle transum, to which are fixed the chains that serve to keep the shafts of the limbers on a march. The fore and hind hooks are used for drawing a gun backwards or forwards, by men with strong ropes, called draught-ropes, fixed to these hooks.

DRAUGHT-HORSE, in farming, a sort of coarse made horse, destined for the service of the cart or plough. In the choice of these horses, for what is called the slow draught, they are to be chosen of an ordinary height; for otherwise, when put into the cart, one draws unequally with the other, and the tall ones hang upon the low ones. The draught horse should be large bodied, and strong loined, and of such a disposition as rather to be too dull than too brisk; and rather to crave the whip, than to draw more than is needful. Mares are the fittest for this use for the farmer, as they will be kept cheap, and not only do the work, but be kept breeding, and give yearly increase of a foal of the same kind, and fit to be bred to the same purposes. They should have a good head, neck, breast, and shoulders: for the rest of the shape, it is not of much consequence, only for breeding; the mare should have a large belly; for the more room a foal has in the dam, the more fit he will be for that employ. See the article FOAL.

DRAW, in the sea-language. A ship is said to draw so much water, according to the number of feet she sinks into it; so that if a ship sink into the water eighteen feet perpendicularly, she is said to draw eighteen feet water; and according as she draws more or less, she is said to be of more or less draught.

DRAW-BACK, in commerce, certain duties, either of the customs or of the excise, allowed upon the exportation of some of our own manufactures; or upon certain foreign merchandize, that have paid duty on importation.

The oaths of the merchants importing and exporting, are required to obtain the draw-back of foreign goods, affirming the truth of the officer's certificate of the entry, and the due payment of the duties: and these may be made by the agent or husband of any corporation or company, or by the known servant of any merchant usually employed in making his entries, and paying his customs. In regard to foreign goods entered outwards, if less quantity or value be fraudulently shipped out than is expressed in the exporter's certificate, the goods therein mentioned, or their value, are forfeited, and no draw-back to be allowed for the same. Foreign goods exported by certificate, in order to obtain the draw-back, not shipped or exported, or re-landed in Great Britain, unless in case of distress, to save them from perishing, are to lose the benefit of the draw-back, and are forfeited, or their value, with the vessels, horses,

carriages, &c. employed in the re-landing thereof; and the persons employed in the re-landing them, or by whose privity they are re-landed, or into whose hands they shall knowingly come, are to forfeit double the amount of the draw-back. Officers of the customs conniving at, or assisting in any fraud relating to certificate-goods, besides other penalties, are to forfeit their office, and to suffer six months imprisonment, without bail or mainprize; as are also masters, or persons belonging to the ships employed therein. Bonds given for the exportation of certificate goods to Ireland, must not be delivered up, nor draw-back allowed for any goods, till a certificate under the hands and seals of the collector or comptroller, &c. of the customs be produced, testifying the landing.

The computation of what is to be drawn back upon the exportation of foreign goods, may be seen under their respective heads.

DRAW-BRIDGE, a bridge made after the manner of a floor, to draw up, or let down, as occasion serves, before the gate of a town or castle. See BRIDGE.

A draw-bridge may be made after several different ways, but the most common are made with plyers, twice the length of the gate, and a foot in diameter. The inner square is traversed with a cross, which serves for a counterpoise; and the chains which hang from the extremities of the plyers to lift up or let down the bridge, are of iron or brass.

In navigable rivers it is sometimes necessary to make the middle arch of bridges with two moveable platforms, to be raised occasionally, in order to let the masts and rigging of vessels pass through. This kind of draw-bridge is represented in plate LXXVIII. where A B is the width of the middle arch; A L and B L, the two piers that support the draw-bridge N O, one of the platforms of which is raised and the other let down, having the beam P Q for its plyer. To N O are suspended two moveable braces E H, E H, which resting on the support E, press against the bracket M, and thereby strengthen the draw-bridge. These braces are conducted to the rest by means of the weight S, pulling the chain S L E.

DRAW-GEAR, denotes any kind of harness for draught horses.

DRAWER *of a bill of exchange*, the person who draws the bill upon his correspondent. See BILL and EXCHANGE.

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DRAWING, in general, denotes the action of pulling out, or hauling along: thus we read of tooth-drawing, wire-drawing, &c. See TOOTH-DRAWING, &c.

DRAWING, the art of representing the appearances of objects by imitation, or copying without the assistance of mathematical rules.

The general precepts for drawing, are as follow. 1. Begin with plain, geometrical figures, as lines, angles, triangles, polygons, arches, circles, ovals, cones, cylinders, and the like, being the foundation of all other proportions. The circle is of use in the several orbicular forms, as the sun, moon, globes, &c. the oval in giving a just proportion to the face and mouth, and the square confines a picture you are to copy, &c. the triangle is of use in drawing a side or half face; angles and arches in perspective, and the polygon in ground plots, fortifications, &c. the cone, in spires, steeples, tops of towers, &c. the cylinder, in columns, pillars, pilasters, &c. See the article PERSPECTIVE.

2. Having brought your hand to be fit and ready in general proportions, accustom yourself to give every object its due shade, according to its concavity or convexity, and to elevate or depress the same, as the object appears either nearer or farther off the light. See the articles PROPORTION, DESIGN, and SHADE.

3. The second practice of drawing, consists in forming fruits, as apples, pears, cherries, &c. with their leaves; the imitation of flowers, as roses, tulips, carnations, &c. herbs, trees, &c. of different kinds.

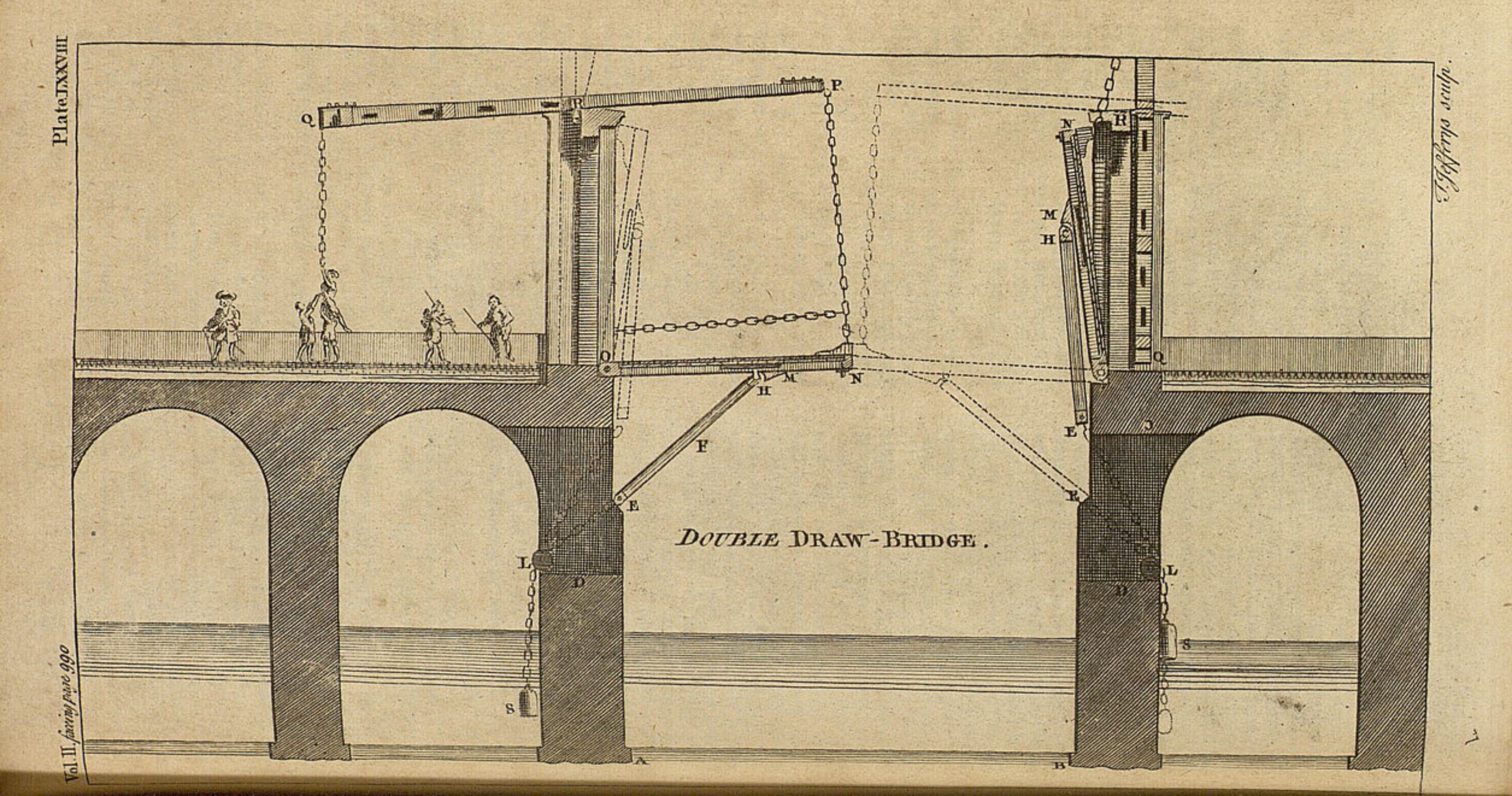
4. The third, in the imitation of beasts, fowls, fishes, &c.

5. The fourth practice of drawing consists in the imitation of the body of man, with all its lineaments, as head, nose, eyes, ears, cheeks, arms, and shadows, all exactly proportioned, both to the whole, and to one another.

6. The fifth is in the drapery, in the imitation of cloathing, and artificially setting off the outward coverings, habit, and ornaments of the body, either of cloth, stuff, silk, or linen, in their natural and proper folds. See DRAPERY.

7. In drawing of all the forms beforementioned, it is requisite to be first perfect in the laying down the exact proportion; secondly, in the general or outward lines, before you proceed to shadowing, or trimming the work within.

8. In mixed and uncertain forms, where the


DOUBLE DRAW-BRIDGE.
T. Jefferys sculp.

the circle, square, &c. will be of no use, but only in the idea thereof in your own fancy, as horses, oxen, and the like, you must do it by judgment, and so gain the true proportions by assiduous practice: thus, having the shape of the thing in your mind, first draw it rudely with a coal; then, with more exactness, with a lead or pencil; then peruse it well, and mend it in those parts you have erred in, according to the idea you carry in your mind. When it is mended by your own judgment, compare it with some good pattern of the same kind, and amend it by that.

9. Having good copies to draw after, learn to reduce them to other proportions, either larger or smaller; and this by frequent practice.

10. Let a perfection in drawing be attained by diligent exercise, and the instruction of a good master, before there be any attempts as to colouring and painting; for the former being attained, the rest will be easily understood, and gained by frequent practice.

Particular observations with regard to DRAWING, *are as follow.* 1. If you draw after a print or picture, place it in such a light, that the gloss of the colours may not interrupt your light, and that the light and your eye may equally and obliquely fall upon the piece, which should be placed at such a distance, that, upon opening your eye, you may view it at once: the larger the picture is, the greater distance off it should be placed: it should also be right before you, and a little reclining.

2. Draw your out-lines at first very faint, and with a coal; and let them be drawn agreeable to the pattern, before you begin to shadow any part of it. When you have drawn one feature, it should, in some measure, be a direction for you to draw the other, by observing the distance from that to the next feature; making a small mark at the place with your coal, then draw it, and so to the next, till you have drawn the whole figure.

3. Then observe the middle of the picture you would copy, and touch upon the paper with the point of your coal: afterwards, observe the more conspicuous and uppermost figures, if there are more than one, which you are to touch lightly in their proper places: thus running over the whole draught, you will see, as it were, the skeleton of the piece to draw.

4. Having made out these sketches, view them diligently, if they answer your pattern or not; for the gestures of the life ought to shew themselves eminently in the first and rudest draughts thereof: correct and mend whatever you perceive amiss, adding and diminishing as it varies from the pattern; by which method it will be brought nearer and nearer to the life.

5. Observe the distance of one limb, joint, or muscle, from another, and the same in all other accidents of the figure, their length, breadth, turnings, &c. shadow next to the light very faintly; and where you see bold and free touches, be not timorous in expressing the same. In drawing a head by the life, or otherwise, take care to place the features exactly right upon the cross lines, whether it be a full face, or three quarter face. In fore-shortening you must make the cross lines to fly upwards, where they look upwards; but where the aspect is downwards, they must be made downwards, in a circular manner. Having drawn the out-lines true, with a coal, you are to proceed to trace the same lines again with a pen, indian ink, &c. drawing them with more exactness, and by imitating all the hatches with their exact distances one from another, their crossings, turnings and windings, with more boldness and freedom perfect your design.

6. In drawing after a naked body, all the muscles are not to be so plainly expressed as in anatomical figures; but that side whose parts are most apparent, and of signification in the performance of any action, must be made to appear more or less, according to the force of that action.

7. In drawing young persons, the muscles must not appear manifestly so hard, as in elder and full grown persons: the same is to be observed as to fat and fleshy persons, and such as are very delicate and beautiful; and in women, scarce any muscles at all are to be expressed, or but very little, unless it be in some very terrible action, and then too they are to be represented very faintly; the like is also to be observed as to little children.

8. The motion of the whole body must be considered in drawing of the muscles; as in the rising and falling of the arms, the muscles of the breast do appear more or less; the hips do the like according as they are bent outward or inward; and it is the same chiefly in the shoulders, sides, and

and neck, according to the ſeveral actions of the body.

9. The proportion of the figure ought to be multiplied by degrees, in proportion of one to two, three, four, &c. for herein the chief ſkill conſiſts: the diameter of the biggeſt place, between the knee and the foot, is double to the leaſt, and the largeſt part of the thigh, triple.

DRAWING MEDICINES, thoſe more uſually called epiſpaſtics and ripeners. See the articles EPSIPASTIC and RIPENERS.

DRAWING *of a bill of exchange.* See the articles DRAWER and BILL.

DRAWING, among ſportſmen, the beating the buſhes after a fox.

Drawing amiſs, is ſaid of the hounds or beagles, when they hit the ſcent of their chace contrary, ſo as to purſue it up the wind, when they ſhould have done it down.

Drawing on the ſlot, is when the hounds touch the ſcent, and draw on till they hit on the ſame ſcent.

DRAWING *a caſt*, among bowlers, is winning the end, without ſtirring the bowl or block.

Fine-DRAWING, among taylors, the art of ſowing up button-holes, or any rents in cloth, in ſo nice a manner, as that they cannot be diſcovered from the entire part of the cloth.

DRAY, a kind of cart uſed by brewers, for carrying barrels of beer or ale; alſo a ſledge drawn without wheels.

DRAY, among ſportſmen, denotes ſquirrel-neſts, built in the tops of trees.

DRAYTON, a market-town of Shropſhire, fourteen miles north-eaſt of Shrewſbury.

DREAMS. According to Wolfius every dream takes its riſe from ſome ſenſation, and is continued by the ſucceſſion of phantaſms in the mind. His reaſons are, that when we dream we imagine ſomething, or the mind produces phantaſms; but no phantaſm can ariſe in the mind, without a previous ſenſation: hence neither can a dream ariſe without ſome previous ſenſation. He obſerves farther, that though it be certain *a priori*, from the nature of the imagination, that dreams muſt begin by ſome ſenſation, yet that it is not eaſy to confirm this by experience; it being often difficult to diſtinguiſh thoſe ſlight ſenſations, which give riſe to dreams from phantaſms or objects of imagination. Yet this is not impoſſible in ſome caſes, as when the weak ſenſation ſufficient to give riſe to a dream gradually becomes ſtronger, ſo as to put an end to it, as it often happens in uneaſy and painful ſenſations.

The ſeries of phantaſms, or objects of imagination which conſtitute a dream, ſeem to be ſufficiently accounted for, from the law of imagination, or of aſſociation; though it may be extremely difficult to aſſign the cauſe of every minute difference, not only in different ſubjects, but in the ſame, at different times, and in different circumſtances. We have an eſſay on this ſubject by M. Formey, in the *Mem. de l'Acad. de Berlin, tom.* 2. p. 316. He expreſsly adopts Wolfius's propoſition above-mentioned, that every dream begins by a ſenſation, and is continued by a ſeries of acts of imagination, or of phantaſms: and that the cauſe of this ſeries is to be found in the law of the imagination.

Hence he concludes thoſe dreams to be ſupernatural, which either do not begin by ſenſation, or are not continued by the law of the imagination.

A learned author has lately aſſerted, that our dreams are prompted by ſeparate immaterial beings. He contends, that the phantaſm, or what is properly called the viſion, is not the work of the ſoul itſelf, and that it cannot be the effect of mechanical cauſes; and therefore ſeems to conclude, they muſt be the work of ſeparate ſpirits acting on our minds, and giving us ideas while we ſleep. We muſt refer to the author of this extraordinary hypotheſis, for a farther account of it. See *Eſſay on the phænomenon of dreaming*, in the 2d vol. of the *Enquiry into the nature of the human ſoul*, 3d edit. Lond. 1745.

Lord Bacon laments that Ariſtotle dropt the conſideration of what he calls the ſecond art of prediction and impreſſion, or the interpretation of natural dreams, which, from the agitation of the mind, diſcovers the ſtate and diſpoſitions of the body, as he honoured phyſiognomy, or the firſt of theſe arts, with an enquiry: though this has indeed been done by Hippocrates; and he obſerves that tho' later ages have debaſed theſe arts with ſuperſtitious and fantaſtical mixtures, yet that when purged and truly reſtored, they have a ſolid foundation in nature, and uſe in life. See PHYSIOGNOMONICS.

Bacon further obſerves, that the interpretation of natural dreams has been much laboured, but mixed with numerous extravagancies, and adds that, at preſent, it

it ſtands not upon its beſt foundation, which is, that where the ſame thing happens from an internal cauſe, as alſo uſually happens from an external one, there the external action paſſes into a dream. Thus the ſtomach may be oppreſſed by a groſs internal vapour, as well as by an external weight, whence thoſe that have the night-mare dream that a weight is laid upon them, with a great concurrence of circumſtances: ſo again the viſcera being equally toſſed by the agitation of the waves at ſea, as by a collection of wind in the hypochondria; hence melancholy perſons frequently dream of ſailing and toſſing upon the waters; and inſtances of this kind are numerous.

The phyſicians who have accurately examined the ſtate of their patients in every particular circumſtance, have not omitted at times, to enquire into their dreams in thoſe hours of ſleep which their ill ſtate allows them; and partly from experience, partly from reaſon and analogy, have found that there are many preſages of diſeaſes to come, and many indications of ſuch as are preſent, but unperceived, at leaſt not ſeen in their full extent, to be had from what the ſenſes ſuffer in dreams. Indeed if dreams are different from what might be expected from the buſineſs of the day, or the turn of thought before, they may always be looked upon as ſigns of a more or leſs diſtempered ſtate of body, and the true condition of that ſtate may often be better learned from them, than from any other means. What has been obſerved by phyſicians in regard to the prognoſtics from dreams, may be ſummed up in the following manner; to dream of fire indicates a redundance of yellow bile: to dream of fogs or ſmoak indicates a predominancy of black bile; to dream of ſeeing a fall of rain or ſnow, or a great quantity of ice, ſhews that there is a redundance of phlegm in the body; he who fancies himſelf converſant among ſtinks, may be aſſured that he harbours ſome putrid matter in his body; to have red things repreſented before you in ſleep, denotes a redundance of blood; if the patient dreams of ſeeing the ſun, moon, and ſtars, hurry on with prodigious ſwiftneſs, it indicates an approaching delirium; to dream of a turbid ſea, indicates diſorders of the belly; and to dream of ſeeing the earth overflowed with water, or of being immerged in a pond or river, indicates a redundance of watery humours in the body; to dream of ſeeing the earth burnt or parched up, a ſign of great heat and drineſs; the appearance of monſters and frightful enemies, indicates deliriums in diſeaſes; and to dream often of being thrown down from ſome very high place, threatens an approaching vertigo, or ſome other diſorder of the head, as an epilepſy, apoplexy, or the like. Theſe and a great many others are the obſervations of Hippocrates on the dreams of his patients. From thoſe and from ſome farther aſſiſtances, Lomnius has carried the ſubject to a very great length, and given many rules of judging from them.

DREDGE, or DREG, among farmers, denotes oats and barley mingled together.

DREDGERS, the term uſed in the admiralty-court for the oyſter-fiſhers.

DREIN, in the military art, a trench made to draw the water out of a moat, which is afterwards filled with hurdles and earth, or with faſcines, or bundles of ruſhes and planks, to facilitate the paſſage over the mud. See the article TRENCHES.

DRENCH, among farriers, a phyſical potion for horſes. The ingredients for this purpoſe are to be beat coarſely, and either mingled with a decoction, or with wine. Then let all infuſe about a quarter of an hour, and give it to the horſe with a horn, after he has been tied up two hours to the rack.

DRESDEN, the capital of upper Saxony, in Germany, ſituated on the river Elbe, ſixty-five miles north-weſt of Prague, and eighty-five ſouth of Berlin: eaſt long. 13° 36′, north lat. 51°.

It is one of the largeſt and ſtrongeſt towns in Germany, and is the uſual reſidence of the elector of Saxony.

DRESSING *of hemp and flax*. See the articles HEMP and FLAX.

DRESSING *of hops*. See the article HOP.

DRESSING *of meats*, that part of cookery which regards animal foods, whether fleſh or fiſh.

DRESSING *of ores*, the breaking and powdering them in the ſtamping-mill, and afterwards waſhing them in a wooden trough. See WASHING *of Ores*.

DRESSING, in ſurgery, the treatment of a wound or any diſordered part. The apparatus of dreſſing conſiſts of doſſils, tents, plaſters, compreſſes, bandages, bands, ligatures, and ſtrings. See the articles WOUND, DOSSIL, TENT, PLASTER, &c.

DREUX, a town of Orleanois, in France, ſeventeen miles north of Chartres, and thirty-five weſt of Paris.

DRIFT *of the foreſt*, is an exact view and examination taken at certain times to know what beaſts are there; in order that none may come on the foreſt but ſuch as have right; and that the foreſt be not overcharged with beaſts.

DRIFT, in mining, a paſſage cut out under the earth, betwixt ſhaft and ſhaft, or turn and turn; or a paſſage or way, wrought under the earth, to the end of a meer of ground, or part of a meer.

DRIFT SAIL, a ſail uſed under water, veered out right a head by ſheets, as other ſails are. It ſerves to keep the ſhip's head right upon the ſea in a ſtorm, and to hinder her driving too faſt in a current.

DRILL, in mechanics, a ſmall inſtrument for making ſuch holes as punches will not conveniently ſerve for. Drills are of various ſizes, and are chiefly uſed by ſmiths and turners.

DRILL, or DRILL-BOX, a name given to an inſtrument for ſowing land in the new method of horſe-hoeing huſbandry. It plants the corn in rows, makes the channels, ſows the ſeeds in them, and covers them with earth when ſown; and all this at the ſame time, and with great expedition. The principal parts are the ſeed box, the hopper, the plough and its harrow, of all which the ſeed box is the chief. It meaſures, or rather numbers, out the ſeeds which it receives from the hopper, and is for this purpoſe as an artificial hand; but it delivers out the ſeed much more equally than can be done by a natural hand. See the article PLOUGH.

Whoever is deſirous of knowing more intimately the whole apparatus for this method of ſowing, may ſee it fully deſcribed, and illuſtrated with figures, by Tull, in his *Horſe-hoeing huſbandry*.

DRINK, a part of our ordinary food in a liquid form, ſerving to dilute and moiſten the dry meat. See the article DIET.

The drinks in different countries are different. The common drink in England is either water, malt liquor, wine, or mixtures of theſe.

The firſt drinks of mankind were certainly water and milk, but the love of luxury and debauchery ſoon introduced the art of preparing intoxicating and inebriating drinks out of vegetables. The vine gave the firſt of theſe liquors; after this, wheat, barley, millet, oats, rice, apples, pears, and pomegranates; and after thoſe the juices drained from the pine, ſycamore, and maple, were brought to this uſe: in latter times, roots, berries, and the pith of the ſugar-cane, have been employed for the ſame purpoſes. Honey alſo is in ſome repute, and before the uſe of the things above-mentioned, the vinous liquor made of honey and water, was in the very higheſt eſtimation. It is acknowledged by many phyſicians, that among the ſtrong drinks, wine is the moſt pernicious; and that good water, milk, beer, and cyder, are greatly preferable to it; none of them bringing on the variety of diſorders to which immoderate wine-drinkers are ſubject, ſuch as decay of ſight, trembling of the limbs, *&c.*

Of all drinks, water is the leaſt flatulent, becauſe the unelaſtic air lodged in it, cannot be extricated by the heat of the body, ſo as to become elaſtic. The moſt flatulent of all drinks, are theſe taken in the act of fermentation; as for example, the ale which is cloſe ſhut up in very ſtrong bottles, and flies out with the greateſt force upon opening them; for by an imprudent uſe of ſuch, the moſt ſevere colic, iliac paſſion, and cholera morbus, frequently enſue. Next to theſe come ſuch drinks as have not yet fermented, but are ſoon ſet to work by the heat of the body; as for example, muſt, new wine, or ale, wherein no bitter herbs, ſuch as hops, wormwood, *&c.* have been boiled as a preſervative.

Dr. Bryan Robinſon thinks that the proportion of meat to drink, ought to be ſuch as ſhall make perſpiration and urine nearly equal at all ſeaſons of the year.

DRIP, in architecture. See LARMIER.

Drips are uſed in building for a certain kind of ſteps made on flat roofs to walk upon, a way of building much uſed in Italy, where the roof is not made quite flat, but a little raiſed in the middle, with drips or ſteps lying a little inclined to the horizon. See the article ROOF.

DRIVERS, among ſportſmen, a machine for driving pheaſant-powts, conſiſting of good ſtrong ozier-wands, ſuch as the baſket-makers uſe; theſe are to be ſet in a handle, and twiſted or bound with ſmall oziers in two or three places.

With this inſtrument, the ſportſman drives whole eyes of young powts into his nets. See the next article.

DRIVING, among ſportſmen, a method of taking pheaſant-powts. It is thus: the ſportſman finds out the haunts of theſe birds; and having fixed his nets there,

there, he calls them together by a pheasant-call, imitating the voice of the dam: after this he makes a noise with his driver, which will make them run a little way forward in a cluster; and this he is to repeat till he has made sure of them, which an expert sportsman never fails to do, by driving them into his nets.

DRIVING, in metallurgy, is said of silver, when in the operation of refining, the lead being burnt away, the remaining copper rises upon its surface in red fiery bubbles. See the article SILVER.

DRIVING, in the sea-language, is said of a ship when an anchor being let fall will not hold her fast, nor prevent her sailing away with the tide or wind. The best help in this case is to let fall more anchors, or to veer out more cable; for the more cable she has out, the safer she rides. When a ship is a-hull or a-try, they say she drives to leeward.

DRIVE-BOLTS, in ship-building. See the article BOLT.

DROCK, in husbandry, the upright piece of timber on the right side of a plough's tail, to which is fixed the earth-board. See the article PLOUGH.

DROGHEDA, a port-town of Ireland, twenty three miles north of Dublin.

DROIT, *jus*, signifies right or law, of which some distinguish six kinds. 1. Jus recuperandi, right of recovery. 2. Jus entrandi, right of entering. 3. Jus habendi, right of having. 4. Jus retinendi, right of retaining. 5. Jus percipiendi, right of receiving. 6. Jus possidendi, right of possessing. See the articles ENTRY, POSSESSION, and RECOVERY.

DROIT is also the highest writ of all other real writs, and takes its name of a writ of right, from the greatest regard being shewn to it; and as it has the most assured and final judgment. There are several sorts of these writs used in our law, as droit de avowson, droit de dower, droit de garde, droit patent, droit rationabili parte, and droit sur disclaimer. See the article RECTO.

DROITWICH, a borough six miles north of Worcester, which sends two members to parliament.

DROMEDARY, *dromedarius*, a large animal of the camel kind, with only one bunch on its back, it is taller than the horse, and has a much longer and slenderer neck: its ears are short, and the upper lip is divided in the manner of that of the hare: It is a native of Asia, and more used for riding on, than for carrying heavy loads. See plate LXXIX. fig. 4.

DRONE, in the history of insects, a kind of bee, larger than the common working or honey-bees: it is so called from its idleness, as never going abroad to collect either honey or wax. See BEE.

The number of these drones in a hive is more or less, according to the season and age of the swarm. In a full hive, they sometimes amount to five or six hundred, or even a thousand.

DRONE-FLY, a two-winged insect, extremely like the common drone-bee, whence also the name.

DROPAX, an external medicine used by the antients for inducing a redness upon a part, and also for taking off the hairs from the body. It was either simple or compound. The simple consists of pitch and wax. The compound dropax, besides pitch and wax, admits pepper, bitumen, rosemary-seed, and euphorbium. It was used in the form of a plaster, or cataplasm.

DROPPING, or DRIPPING, among falconers, is said of a hawk which mutes directly downwards in several drops, not yerking her dung straight forwards.

DROPS, in architecture, an ornament in the doric entablature representing drops, or little bells immediately under the triglyphs.

DROPS, in meteorology, small spherical bodies which the particles of fluids spontaneously form themselves into, when let fall from any height. This spherical figure, the newtonian philosophers demonstrate to be the effect of corpuscular attraction, for considering that the attractive force of one single particle of a fluid is equally exerted to an equal distance, it must follow that other fluid particles are on every side drawn to it, and will therefore take their places at an equal distance from it, and consequently form a round superficies. See the articles ATTRACTION, FLUID, and RAIN.

DROPS, in medicine, a liquid remedy, the dose of which is estimated by a certain number of drops.

DROPS *of life*, *guttæ vitæ*, a tincture produced from opium, english saffron, russia castor, cochineal, and Virginia-snake-root, nutmegs, zedoary, and camphire, with the tincture of antimony. This medicine, though not commonly met with, is accounted one of the best preparations of the kind. It promotes

 sweat

ſweat very much, and is wonderfully carminative. The doſe is from ten to forty, fifty, or ſixty drops.

Engliſh Drops, *guttæ anglicanæ*, a name given to a chemical preparation eſteemed of great virtue againſt vapours, and lethargic affections, and purchaſed at 5000 l. by king Charles II. from the inventor Dr. Goddard. The medicine appeared to be only a ſpirit drawn by the retort from raw ſilk, and afterwards rectified with oil of cinnamon, or any other eſſential oil, and was in reality no better than the common ſal volatile oleoſum, or any of the volatile ſpirits impregnated with an eſſential oil, except that it was leſs diſagreeable than any of them to the taſte.

DROPSY, ὑδρωψ, in medicine, an unnatural collection of watry humours in any part of the body.

Dropſies are of various kinds, but thoſe moſt common are the anaſarca, aſcites, and tympanites. See the article Anasarca, &c.

Among the cauſes of theſe diſeaſes may be reckoned a family or conſtitutional diſpoſition thereto; a haſty drinking cold water in too large quantities; a ſtoppage of the natural diſcharges of perſpiration and urine; a lienterious diſorder of long continuance; all obſtinate obſtructions of the viſcera; the jaundice, diarrhœa, dyſentery, coeliac paſſion, and gout; drinking ſharp, fermented, and ſpirituous liquors; and the like.

As to the ſymptoms, the feet and legs firſt ſwell; and when theſe are diſtended to the utmoſt, the waters ruſh into the abdomen, and cauſe it to ſwell by little and little, till at length the more noble viſcera are affected thereby, and the patient is ſoon overwhelmed with the deluge. In proportion as the diſeaſed parts increaſe in bulk, the reſt fall away; and at the ſame time, the difficulty of breathing, and other ſymptoms grow more intolerable.

When the abdomen is ſwelled, it will reſound when ſtruck, if the diſeaſe be a tympany; and if an aſcites, the noiſe of the fluctuating waters is heard. Beſides theſe ſymptoms, the patient is alſo afflicted with a heavineſs, ſtupor, coſtiveneſs, and at length with a ſlow fever. The waters too, after being long pent up in a cloſe place, grow acrimonious; and hence ulcers, gangrenes, bleeding at the noſe, a mortification of the viſcera, and death.

In the anaſarca, as well as in the more advanced ſtages of a dropſy, the chief indications of cure, are to reſtore the humours to their natural fluidity, invigorate the languid circulation, brace up and ſtrengthen the relaxed ſolids, promote the ſecretions, and carry off the redundant ſtagnating juices. To this purpoſe, draſtic purges, ſteel-medicines, abſorbents, detergents, and ſtomachics, are recommended. A briſk purge ſhould be taken early every morning, or every other day, according to the ſtrength of the patient, till the ſwelling of the parts affected abate.

Elaterium, and antimonial wine, are ſaid to be excellent for dropſical patients, who are not eaſily purged; two grains of the former being a proper doſe for moſt conſtitutions; and of the latter, or antimonial wine, a dram and a half, or two drams, may be taken every morning: this frees the abdomen from the load of waters. Some greatly recommend Bontius's pills, the doſe of which is from half a ſcruple to a ſcruple. Mercurius dulcis, and the juice of the root of iris paluſtris lutea are alſo recommended; eighty drops of this laſt may be given every hour in a little ſyrup of buckthorn.

As to cathartics, the ſlow ones are rather hurtful than beneficial; and therefore, the purge had better be too ſtrong than too weak, that the waters may be carried off with as much ſpeed as the patient's ſtrength will bear. When the patient is of a very weakly conſtitution, it is proper to omit all purgatives, and give diuretics, and the lixivial ſalts in their ſtead, eſpecially nitre. Some alſo have been cured by a pertinaceous abſtinence from all liquids, excepting a little rich wine.

When the waters are by theſe means carried off, the tone of the debilitated viſcera ſhould be reſtored by the uſe of wines, ſteel, and ſuch ſtrengtheners as are greatly aſtringent; in which caſe, purging muſt be omitted, as alſo during the uſe of the lixivial ſalts; but ſtrengtheners may be properly uſed with theſe laſt.

For the operation of tapping for the dropſy, called by ſurgeons paracenteſis, See the article Paracentesis.

DROP-WORT, in botany, the ſame with filipendula. See Filipendula.

Water Drop-wort, the engliſh name of a plant, called by authors oenanthe. See the article Oenanthe.

DROSERA,

DROSERA, SUN-DEW, in botany, a genus of the pentandria-pentagynia clafs of plants, with a funnel-fafhioned flower, confifting of five obtufely-ovated petals : the fruit is an unilocular, fuboval capfule, containing a great many very fmall feeds.

DROUGHT, in the hiftory of the air, a long continuance of dry weather.

Great droughts are often very prejudicial to the farmer, unlefs the lands lie very low, and are well fupplied with water, or defended from the fcorching heat of the fun by tall inclofures. See the article INCLOSURE.

The laft of thefe is always in the farmer's power, and fhould be carefully provided by planting hedges in a proper manner, in counties moft fubject to fuffer by this difadvantage. The other is not always fo eafy, but may be managed feveral ways, as by finking wells; but thefe, when deep, are very expenfive; or by bringing the water in pipes, gutters, or other conveyances: and this is eafily done where there is a fpring or brook in the neighbourhood higher than the lands. Pumps, wheels, and fuch other engines are alfo ufed in fome places to bring on the water; and in others, ponds, cifterns, and receptacles are made to take in the rains and winter floods, and retain the water till fummer, when it is wanted.

The farmers of England are very deficient in this laft method, which they might ufe to their great benefit in many places. In Spain they have no water in many parts but what they preferve in this manner. And at Amfterdam and Venice they have whole cellars made into cifterns, which receive the water that falls in rains, and preferve it all the year. Want of water for the cattle in fummer in many places might be eafily remedied by fome care of this kind, and many thoufand acres of land made ufeful, which are now left as wafte, by this means alone. It is very evident that this is feafible, becaufe it is done in places where there falls much lefs rain annually than with us; and yet by this the inhabitants have always frefh water enough for the ufe of their houfes, cattle and gardens, none of which ever fail.

DROWNING, the act of fuffocating, or being fuffocated, by water.

Naturalifts and phyficians furnifh us with divers well attefted inftances of furprizing recoveries of perfons drowned. It is certain from repeated diffections made on perfons drowned, that they generally have lefs water in their ftomachs, than if they had voluntarily drunk a confiderable quantity: whence it does not feem expedient to hang the drowned perfon by the heels, a pofition that muft prove uneafy as foon as the humours of the body fhould refume their ordinary motion. In order to know whether the perfon has fwallowed too much water, or not, and to make him vomit it up if he has, it is proper to put him in a tun, open at both ends, which is to be rolled in different directions; or the bearded end of a feather fhould be introduced into the œfophagus. After taking off the cloaths of the drowned perfon, we ought, with the utmoft expedition, to fhelter him from the impreffions of the cold air, and begin to warm him by wrapping him up with cloaths and coverings: to do this more effectually, he is afterwards to be put into a pretty warm bed, applying alfo to his body hot napkins and cloths. A hot fcorching fun, to which drowned perfons have been expofed, and hot baths, have produced the fame happy effects.

The great intention to be purfued is, to put the folid parts of the machine in action, that thus they may reftore the motion of the fluids: in order to this, the drowned perfon fhould be agitated in various directions, in a bed, in the arms of perfons of fufficient ftrength. Spirituous liquors fhould be poured into his mouth; or warm urine; and fome perfons prefcribe a decoction of pepper and vinegar, as a gargarifm; we muft alfo attempt to irritate the internal fibres of the nofe, either by volatile fpirits, and by the liquors ufed in apoplectic cafes; or by tickling the nerves of the noftrils with a bearded feather, or by blowing through a quill, fnuff, or fome other more powerful fternutatory. One of the means frequently ufed with fuccefs, is to blow warm air, by means of a pipe, into their mouths; or to introduce it by a pair of bellows: or, by injecting warm clyfters, to irritate the inteftines: the fmoke of tobacco conveyed into the inteftines, by means of a tobacco-pipe, is much recommended. Venefection is by no means to be neglected; and perhaps moft fuccefsfully in the jugular vein; and when all thefe meafures prove unfuccefsful, the laft recourfe is bronchotomy. See the article BRONCHOTOMY.

DRUG, a general term for goods of the druggiſt and grocery kinds, eſpecially for thoſe uſed in medicine and dying.

The principal drugs in medicine make the greateſt part of the wholeſale trade in the druggiſt and ſpicery ways. Some are produced in France, England, *&c.* but the greateſt part is brought from the Levant, and the Eaſt Indies. The chief drugs imported into this kingdom, are from the Eaſt-Indies, being as follows, alum, china-root, camphor, rhubarb, muſk, vermilion, ſoy of japan, ketchup, ſtick-lack, roſam aloes, ſhell-lack, borax, lapis lazuli, galangal, benjamin, aquila-wood, gamboge, putchuck, or coſtus dulcis, dragons blood, cubebs, cardamoms, olibanum, chengue, ſalt-petre, aloe-hepatica, bezoar-ſtone, lignum aloes, caſſia, goa-ſtone, opium, unicorn's horn, civet, frankincenſe, tamarinds, turmeric, rock-ſalt, ſaffron, myrrh, manna, renes, tacamahac, ambergreaſe, dammer, coyr, cowries, chank, nux vomica, ſnake-ſtone, caſſia lignum, aſſafœtida, dry ginger, long pepper, tyncal, ſago, lapis tutiæ, wormſeed, galbanum, gum-elemi, ammoniacum, tragacanth. See the articles ALUM, CHINA ROOT, *&c.*

Drugs for dying are of two principal ſorts, *viz.* drugs that do not give any colour of themſelves, but prepare the ſtuff to take the dye, or make the colours more lively and ſtrong; and drugs that colour.

Of the firſt ſort are alum, tartar, arſenic, realgal, ſalt-petre, nitre, ſal-gem, ſal-armoniac, common ſalt, mineral ſalt, ſalt of cryſtal, of tartar, agaric, ſpirit of wine, urine, pewter, bran, ſtarch, *&c.* Some of the colouring drugs are wood, indigo, ſcarlet wood, logwood, ironwood, *&c.* ſcarlet grain, cochineal, madder, goats hair, greening weed, ſavory, chimney-ſoot, *&c.*

There are other drugs uſed in common by both, which colour either faintly, or very much; as the root, bark, and leaf of the walnut-tree; the rind of the nut, gall-nuts, ſumach, copperas, *&c.*

DRUG is uſed to ſignify things of little value expoſed to ſale.

DRUG, among fan-makers, is a compoſition of gum arabic, and ſome other ingredients uſed in laying gold or ſilver leaf upon fans; or, in covering them with either of theſe metals in powder. They uſe it alſo to paſte together the papers, gawzes, taffeta's, and other like matters, uſed by them in their fans.

DRUG ſignifies alſo a ſalt, or cinder of glaſs, uſed by ſome in bleaching cloth. The uſe of this drug is prohibited in France, as being found corroſive, deſtructive of the linen, and capable of hurting the health of thoſe who uſe it. See the article BLEACHING.

DRUGS of the french dominions pay for every 20 s. value of their reſpective rates (a few excepted) on importation, 4 s. $9\frac{75}{100}$ d. and draw back on exportation 4 s. $4\frac{05}{100}$ d. If for dyer's uſe, they pay 6 s. $7\frac{65}{100}$ d. and draw back 6 s. $1\frac{05}{100}$ d. Drugs of the growth, product or manufacture of France for every 20 s. value of their reſpective rates (ſome excepted) pay 6 s. $5\frac{75}{100}$ d. and draw back 4 s. $4\frac{05}{100}$ d. but if for dyer's uſe, they pay 11 s. $7\frac{65}{100}$ d. and draw back 6 s. $1\frac{05}{100}$ d. All drugs imported from the britiſh plantations, in britiſh built ſhipping, notwithſtanding they come from the ſpaniſh Weſt-Indies to ours, ſhall pay as from the place of growth and no otherwiſe.

DRUGGET, in commerce, a ſtuff ſometimes all wool, and ſometimes half wool half thread, ſometimes corded, but uſually plain.

Thoſe that have the woof of wool, and the warp of thread, are called threaded druggets; and thoſe wrought with the ſhuttle on a loom of four marches, as the ſerges of Moui, Beauvois, and other like ſtuffs, corded, are called corded druggets. As to the plain, they are wrought on a loom of two marches, with the ſhuttle, in the ſame manner as cloth, camlets, and other like ſtuffs, not corded.

DRUIDS, the prieſts or miniſters of religion of the antient Britons, and Gauls. The druids were choſe out of the beſt families; and were held, both by the honours of their birth, and their office, in the greateſt veneration. They are ſaid to have underſtood aſtrology, geometry, natural hiſtory, politics, and geography: they had the adminiſtration of all ſacred things, were the interpreters of religion, and the judges of all affairs indifferently.

Whoever refuſed obedience to them, was declared impious and accurſed; they held the immortality of the ſoul, and the metempſychoſis; they are divided by ſome into ſeveral claſſes, as the vacerri, bardi, eubagis, ſemnothii, and ſaronidæ: they had a chief, or arch-druid, in every nation;

nation: he was a fort of high-prieft, having an abfolute authority over the reft, and was fucceeded by the moft confiderable among his furvivors. The youth ufed to be inftructed by them, retiring with them to caves, and defolate forefts, where they were fometimes kept twenty years. They preferved the memory and actions of great men by their verfes; but are faid to have facrificed men to Mercury. Cæfar imagined that the druids came from Britain into Gaul, but feveral among the modern writers are of a different opinion.

DRUM, *tympanum*, is a military mufical inftrument in form of a cylinder, hollow within, and covered at the two ends with vellum, which is ftretched or flackened at pleafure by the means of fmall cords and fliding knots. It is beat upon with fticks. Some drums are made of brafs, but they are commonly of wood.

There are feveral beats of the drum, as affembly, chamade, reveillé, retreat, *&c.* See ASSEMBLY, CHAMADE, *&c.*

Kettle DRUMS, are two forts of large bafons of copper or brafs, rounded in the bottom, and covered with vellum or goat-fkin, which is kept faft by a circle of iron, and feveral holes faftened to the body of the drum, and a like number of fcrews to fcrew up and down. They are much ufed among the horfe, as alfo in operas, oratorios, concerts, *&c.*

DRUM, or DRUMMER, he that beats the drum, of whom each company of foot has one, and fometimes two. Every regiment has a drum-major, who has the command over the other drums. They are diftinguifhed from the foldiers, by cloaths of a different fafhion: their poft when a battalion is drawn up, is on the flanks, and on a march it is betwixt the divifions.

DRUM *of the ear*, in anatomy. See the article EAR.

String of the DRUM. See CHORD.

DRUM, in architecture. See TAMBOUR.

DRUMLANERK, a town of Scotland, in the county of Nithfdale, fituated on the river Nith, fifteen miles from Dumfries: weft long. 3° 33′, north lat. 55° 13′.

DRUNGUS, a name given in the latter times of the roman empire to a body of troops, amounting from one thoufand to four thoufand men. At firft it was ufed to denote the troops of ftrangers and enemies, but in the eaftern empire to fignify the troops of the empire itfelf.

DRUNKENNESS, *ebrietas*, phyfically confidered, confifts in a preternatural compreffion of the brain, and a difcompofure of its fibres, occafioned by the fumes or fpirituous parts of liquors. It is accounted for thus, an immoderate quantity of wine taken into the ftomach, is there heated and undergoes a kind of effervefcence, which happens the more readily, as the liquor abounds more in fulphur. By this action it becomes rarefied, fo that, the groffer parts being left behind, its finer parts fhoot through the veins to the brain; or are conveyed through the veins to the heart, whence, after a farther heat of rarefaction, they are fent through the carotid arteries, *&c.* to the brain. Hence neceffarily arifes a repletion of the meninges, and a compreffion of the fibres of the brain, from the frefh ftock of rarefied fulphur continually exploded into them: hence it is that all liquors will not give drunkennefs; but fuch only as by their fulphur or fpirit are difpofed for an effervefcence in the ftomach and heart to diffufe their fubtile parts plentifully to the brain. Drunkennefs appears in different fhapes, in different conftitutions. Some it makes gay, fome fullen, and fome furious. Hobbes makes voluntary drunkennefs a breach of the law of nature, which directs us to preferve the ufe of our reafon. The law of England does not allow it to be an excufe in any cafe whatfoever. On the contrary, it is punifhable, the penalty being five fhillings fine, or the ftocks, in cafe of non-payment.

DRUPE, among botanifts, a kind of pericarpium, confifting of a foft, flefhy, and fucculent pulp, with a nucleus, or kernel in its center.

DRUSENHEIM, a town of Alface, in Germany, fituated on the weft fide of the Rhine, four miles fouth-eaft of Hagenau: eaft long. 8°, north lat. 48° 40′.

DRY BATHS, } See { BATH.
DRY CONFECTS, } See { CONFECTS.
DRY DOCK, } See { DOCK.

DRY CUPPING, in furgery. See CUPPING.

DRY MEAT, in the manege, is ufed for corn and hay. After taking the horfe from grafs he is houfed, and put to dry meat.

DRY MEASURE, } See the articles { MEASURE.
DRY MOAT, } See the articles { MOAT.
DRY RENT, } See the articles { RENT.
DRY SPAVIN, } See the articles { SPAVIN.
DRY STORAX, } See the articles { STORAX.
DRY SUTURE, } See the articles { SUTURE.

DRYADS, *dryades*, in the heathen theology, a ſort of deities, or nymphs, which the antients thought inhabited groves and woods. They differed from the Hamadryades, theſe latter being attached to ſome particular tree, with which they were born, and with which they died; whereas the Dryades were goddeſſes of trees and woods in general.

We likewiſe find mention made of a kind of propheteſſes, or witches, among the Gauls, called dryades or druids. See the the article DRUIDS.

DRYAS, in botany, a genus of the icoſandria-pentagynia claſs of plants, the flower of which conſiſts of eight oblong, emarginated, patent petals, inſerted into the cup. There is no pericarpium, but the ſeeds are numerous, of a roundiſh compreſſed figure, and furniſhed with very long hairy ſtyles.

DRYPIS, a genus of the decandria-trigynia claſs of plants, the corolla whereof conſiſts of five petals, their ungues are of the length of the cup, and narrow; the limb is plane; the bracteæ are divided into two linear obtuſe ſegments; the fruit is a ſmall, globoſe, covered capſule, with only one cell, in which is a ſingle kidney ſhaped ſeed.

DUAL *number*. See the article NUMBER.

DUBLIN, the capital of the province of Leinſter, and of all Ireland, ſituated at the mouth of the river Liffee, ſixty miles weſt of Holyhead in Wales: weſt long. 6° 25′, north lat. 53° 16′.

It is a large and beautiful city, pleaſantly ſituated; having a view of the ſea on one ſide, and of a fine country on the other. It is the ſeat of the courts of juſtice, and an archbiſhop's ſee; and has a noble college, which is an univerſity of itſelf.

DUCAL, in general, ſomething belonging to a duke. See the article DUKE.

DUCAT, a coin current in Germany, and other countries abroad, for the different values of which ſee COIN.

DUCATOON, a ſilver coin, likewiſe frequent in ſeveral parts of Europe. See the article COIN.

DUCENARIUS, in roman antiquity, a military officer, who had the command of two hundred men.

The title ducenarii is alſo given to certain procurators of the emperors, ſo called either from their having a ſalary of 200 ſeſterces, or from their being appointed to raiſe the tax of the two hundredth penny.

DUCES TECUM, in law, a writ that commands a perſon to appear in the court of chancery, and bring with him certain writings, evidences, or other things, which the court is inclined to view.

DUCES *tecum licet languidus*, in law, is a writ directed to the ſheriff on a return, that he is not able to bring his priſoner without danger of death, he being *adeo languidus*: upon which the court grants a habeas corpus, in nature of a *duces tecum licet languidus*.

DUCK, *anas*, in ornithology, is characterized in general under the article ANAS.

There are two ſorts of ducks common with us, the tame and wild; whereof the firſt is very beneficial to the huſbandman, and at the ſame time requires no charge to keep, living on loſt corn, worms, ſnails, &c. Indeed once a year this fowl is a great layer of eggs, and when ſhe ſits, muſt be carefully fed with barley or other grain. As to the ducklings, they are fed in the ſame manner as goſlings, and may be fattened in three weeks time, by giving them any kind of pulſe, or grain, and plenty of water.

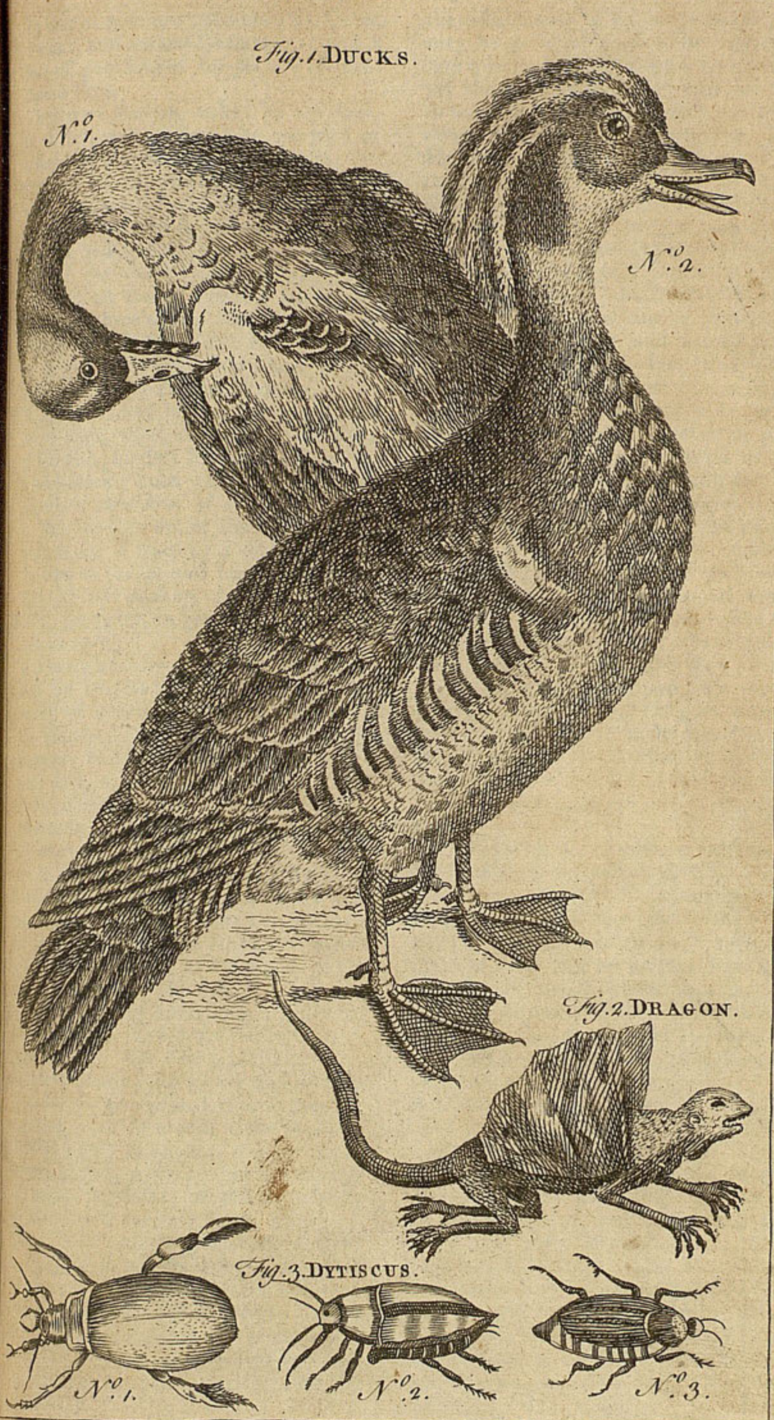
For preſerving wild ducks, a place (with a pond in it) muſt be walled in, and covered a-top with a ſtrong net: the pond is to be ſet with turfs of oziers, and have many ſecret holes and creeks, whereby they will be induced to feed freely, though impriſoned. Teals, widgeons, ſhell-drakes, and green plovers, may alſo be ordered in the ſame manner.

Of exotic or foreign ducks, authors deſcribe a great many ſpecies, as the muſcovy-duck, with a naked papilloſe face, the tufted duck, the braſilian duck, as large as a gooſe, St. Cuthbert's duck, the forked-tailed duck, the black duck, &c. See plate LXXX. fig. 1. where n° 1. repreſents the little black and white duck, ſomewhat leſs than the common kind; and n° 2. the ſummer duck of Mr. Cateſby, likewiſe leſs than the common duck: it has a double plume or creſt, the uppermoſt of a ſhining green, and the under one of a dark, ſhining purple colour.

DUCKER, or DOUCKER, a particular kind of game-cock, that in fighting runs about the clod almoſt at every blow he gives.

This is alſo a name given to the colymbus, or diver. See COLYMBUS.

DUCKING, plunging in water, a diverſion antiently practiſed among the Goths, by



T. Jefferys sculp.

by way of exercife; but among the Celtæ, Franks, and antient Germans, it was a fort of punifhment for perfons of fcandalous lives.

They were fhut up, naked to the fhift, in an iron cage, faftened to the yard of a fhaloop, and ducked feveral times.

DUCKING *at the main-yard,* among feamen, is a way of punifhing offenders on board a fhip; and is performed by binding the malefactor, by a rope, to the end of the yard, from whence he is violently let down into the fea, once, twice, or three times, according to his offence: and if the offence be very great, he is drawn underneath the keel of the fhip, which they call keel-haleing.

DUCKUP, at fea, is a term ufed by the fteer's-man, when the mainfail, forefail, or fpritfail, hinders his feeing to fteer by a land-mark: upon which he calls out, *duckup the clew lines of thefe fails,* that is, hale the fails out of the way. Alfo, when a fhot is made by a chafe-piece, if the clew of the fpritfail hinders the fight, they call out, *duck up,* &c.

DUCT, DUCTUS, in general, denotes any tube or canal.

It is much ufed by anatomifts, who mention the adipofe ducts, concerning the reality of which authors are not agreed; the thoracic, or chyliferous duct; the excretory ducts of the glands; the hepatic duct, or porus bilarius; the falival ducts; the lachrymal ducts; the ductus communis choledochus, *&c.* concerning all which it is to be obferved, that their ufe is to convey certain animal fluids fecreted in the glands of the parts to which they feverally belong: thus it is, the falival ducts difcharge the faliva, or pellucid liquor, fecreted in the glands of the mouth; and fo of the reft.

Air-DUCT, among ichthyologifts, a canal reaching from the air-bladder in fifhes to their ftomach. See AIR-BLADDER.

Alimentary DUCT, an appellation ufed by fome for the whole canal of the inteftines, reaching from the mouth to the anus.

DUCTILITY, in phyfics, a property of certain bodies, whereby they are capable of being expanded, or ftretched forth, by means of a hammer, prefs, *&c.*

The vaft ductility of fome bodies, efpecially gold, is very furprifing: the goldbeaters and wire-drawers furnifh us with abundant proofs of this property; they, every day, reduce gold into lamellæ inconceivably thin, yet without the leaft aperture, or pore difcoverable, even by the microfcope: a fingle grain of gold may be ftretched under the hammer, into a leaf, that will cover a houfe, and yet the leaf remain fo compact, as not to tranfmit the rays of light; nor even admit fpirit of wine to tranfude. Dr. Halley took the following method to compute the ductility of gold: he learned from the wire-drawers, that an ounce of gold is fufficient to gild, that is, to cover, or coat, a filver-cylinder of forty-eight ounces weight, which cylinder may be drawn out into a wire fo very fine, that two yards thereof fhall only weigh one grain; and confequently ninety-eight yards of the fame wire, only forty-nine grains: fo that a fingle grain of gold here gilds ninety-eight yards; and, of courfe, the ten thoufandth part of a grain is here above one third of an inch long. And fince the third part of an inch is yet capable of being divided into ten leffer parts vifible to the naked eye, it is evident that the hundred thoufandth part of a grain of gold may be feen without the affiftance of a microfcope. Proceeding in his calculus, he found, at length, that a cube of gold, whofe fide is the hundredth part of an inch, contains 2,433,000,000 vifible parts; and yet, though the gold wherewith fuch wire is coated, be ftretched to fuch a degree, fo intimately does its parts cohere, that there is not any appearance of the colour of the filver underneath.

Mr. Boyle examining fome leaf-gold, found that a grain and a quarter's weight took up an area of fifty fquare inches; fuppofing therefore the leaf divided by parallel lines $\frac{1}{100}$ of an inch apart, a grain of gold will be divided into five hundred thoufand minute fquares, all difcernable by a good eye: for gold-wire, the fame author fhews, that an ounce of gold drawn out therein, would reach 155 miles and a half.

But Mr. Reaumur has carried the ductility of gold to a ftill greater length: a gold wire every body knows is only a filver one gilt. This cylinder of filver, covered with leaf-gold, they draw thro' the hole of an iron, and the gilding ftill keeps pace with the wire, ftretch it to what length they can. Now Mr. Reaumur fhews, that in the common way of drawing gold-wire, a cylinder of filver twenty-two inches long, and fifteen lines in diameter is ftretched to 1,163,520 feet, or is 634,692 lines longer than be-

fore, which amounts to about ninety-seven leagues. To wind this thread on silk for use, they first flatten it, in doing which it stretches at least $\frac{1}{7}$ farther, so that the twenty-two inches are now 111 leagues: but in the flattening, instead of $\frac{1}{7}$, they could stretch it $\frac{1}{4}$, which would bring it to 120 leagues. This appears a prodigious extension, and yet it is nothing to what this gentleman has proved gold to be capable of.

DUEL, a single combat, at a time and place appointed, in consequence of a challenge. This custom came originally from the northern nations, among whom it was usual to decide all their controversies by arms. Both the accuser and accused gave pledges to the judges on their respective behalf; and the custom prevailed so far amongst the Germans, Danes and Franks, that none were excused from it but women, sick people, cripples, and such as were under twenty-one years of age, or above sixty. Even ecclesiastics, priests, and monks, were obliged to find champions to fight in their stead. The punishment of the vanquished was either death, by hanging or beheading; or, mutilation of members, according to the circumstances of the case. Duels were at first admitted not only on criminal occasions, but on some civil ones for the maintenance of rights to estates, and the like: in latter times, however, before they were entirely abolished, they were restrained to these four cases: 1. That the crime should be capital. 2. That it should be certain the crime was perpetrated. 3. The accused must, by common fame, be supposed guilty. And, 4. The matter not capable of proof by witnesses. In England, though the trial of duel is disused, the law on which it is founded is still in force. See the article CHAMPION.

DUEL, at present, is used for a single combat on some private quarrel, and must be premeditated, otherwise it is called a rencounter. If a person be killed in a duel, both the principals and seconds are guilty of murder, whether the seconds engage or not. It is also a very high offence to challenge a person, either by word or letter, or to be the messenger of a challenge. The severe edicts made by Lewis XIV. against duels, have in a great measure put a stop to the custom in France.

DUERO, or DURO, a large river, which, rising in Old Castile, in Spain, runs from east to west, crosses the province of Leon, and, after dividing Portugal from Spain by a southerly course, turns westward, crosses Portugal, and falls into the Atlantic ocean at Porto-Port.

DUKE is either the title of a sovereign prince, as the duke of Savoy, Parma, *&c.* the grand duke of Tuscany, Muscovy, *&c.* or it is the title of honour and nobility next below princes. The commanders of armies in time of war, the governors of provinces, and wardens of marches, in time of peace, were called *duces*, under the latter emperors. The Goths and Vandals divided all Gaul into dutchies and counties, the governors of which they sometimes call *duces*, and sometimes *comites*. In France, under the second race of kings, though they retained the name and form of ducal government, there were scarce any dukes except those of Burgundy, Aquitain, and France. In England, among the Saxons, the commanders of armies, *&c.* were called dukes, *duces*, without any addition, till Edward III. made his son, the black prince, duke of Cornwal; after whom there were more made in the same manner, the title descending to their posterity. Duke, then, at present, is a mere title of dignity, without giving any domain, territory, or jurisdiction over the place from whence the title is taken. A duke is created by patent, cincture of sword, mantle of state, imposition of a cap and coronet of gold on his head, and a verge of gold put into his hand. His title is Grace; and, in the style of the heralds, Most high, potent, high-born, and noble prince.

DUKE, among hebrew grammarians, an appellation given to a species of accents, answering to our comma.

DULCIFYING, in pharmacy, is the sweetening any matter impregnated with salts, by frequently washing it in pure water.

DULEDGE, in gunnery, a peg of wood which joins the ends of the six fellows that form the round of the wheel of a gun-carriage. The plate of iron on the outside of the wheel, which strengthens the joint, is called the duledge-plate.

DULL, in the manege. The marks of a dull horse, called by the French, marquis de ladre, are white spots round the eye, and on the tip of the nose, upon any general colour whatsoever. Though the vulgar take these spots for signs of stupidity, it is certain they are great marks of the goodness of a horse; and the horses that-

that have them are very fenfible and quick upon the fpur.

DULWICH, a village near London, remarkable for its mineral waters, which are faid to contain a bitter cathartic falt, but no iron.

DUMBLAIN, a town of Scotland, in the fhire of Mentieth, about five miles north of Stirling: weft long. 3° 45′, north lat. 56°.

DUMBNESS, the deprivation of fpeech. See the article SPEECH.

Dumbnefs may be owing either to the want, or bad conformation of the tongue. See the article TONGUE.

DUMFERMLING, a parliament-town of Scotland, fituated in the county of Fife, fifteen miles north-weft of Edinburgh: weft long. 3° 20′, and north lat. 56° 15′. Here was formerly a magnificent abbey and palace of the kings of Scotland, in which the princefs Elizabeth, daughter of King James VI, and mother of the princefs Sophia, from whom the prefent royal family are defcended, was born.

DUMFRIES, the capital of a county of the fame name, in Scotland, lying northwards of the Solway frith: weft lon. 3° 10′, and north lat. 54° 45′.

DUM *fuit infra ætatem*, is a writ, than an infant, who by feoffment has aliened his lands, may have, when he arrives to full age, for the recovery of what he fo aliened: and during his non-age, it is faid, he may enter on the land, and take it back again; for, by his entry, he fhall be remitted to his anceftor's right.

DUM *non fuit compos mentis*, in law, a writ which a perfon who is not found in memory, having aliened lands, or tenements, fhall have againft the alienee; in which he muft alledge, that he was not *fanæ memoriæ*, but being vifited with infirmity, loft his difcretion for a time, fo as not to be capable of making any grant, &c.

DUNBAR, a parliament and port-town of Scotland, about twenty-five miles eaft of Edinburgh: weft long. 2° 12′, north lat. 56°.

DUNBARTON, the capital of a county of the fame name in Scotland, called by fome Lenox: it is a parliament-town, fituated at the confluence of the rivers Clyde and Leven; fixteen miles north-weft of Glafgow.

DUNCANNON, a town of the county of Wexford, in Ireland, fix miles eaft of Waterford.

DUNDALK, a port-town of Ireland, eighteen miles north of Drogheda; weft longitude 6° 40′ north latitude 54° 5′.

DUNDEE, a large parliament-town of Angus, in Scotland, fituated on the north fide of the frith of Tay, fourteen miles north-weft of St. Andrews: weft long. 2° 42′, and north lat. 56° 32′.

DUNG, in hufbandry, is of feveral forts, as that of horfes, cows, fheep, hogs, pigeons, geefe, hens, &c.

All dungs are very enriching to lands; but fome, as horfe's, fheep's, pigeon's, &c. being hot and light, are fitteft for cold lands; as thofe of cows, hogs, &c. are for hot and dry lands, on account of their cooling qualities; or mixed together in different proportions, they may be made to anfwer for all forts of ground. In winter, or rainy weather, it is proper to turn up the dung in as large heaps as poffible, to prevent the rain's wafhing away its fatnefs and nitrous quality; which purpofe the dung-meers anfwer extremely well. See the article DUNG-MEERS.

DUNGANNON, a town of Ireland, in the county of Gyrone, and province of Ulfter, fituated eleven miles north of Armagh: weft long. 7°, north lat. 54° 28′.

DUNGEON, or DONJON, in fortification. See the article DONJON.

DUNGING *of paftures*, &c. The beft time for dunging of paftures and meadows is in the winter feafon, about January or February, that the rain may wafh the fatnefs of the foil to the roots of the grafs before the fun drives it away. The dung may be fpread with a brufh, drawn over the ground like a harrow, before the grafs is too high: and for rufhy cold land, wood-afhes, fea-coal, peat, turf, or the like fuel, is very proper to be laid on. The dung of pigeons, or other fowl, has a better effect here than on any other lands; alfo all hot and fandy foils are fitteft for this fort of ground: but for fuch land of this kind, as is fandy, or hot, lime, chalk, marl, or any cold foils, digged out of the earth, are of fingular ufe, as well as for corn-lands; fo is urry in like manner. As for meadows, or grounds of a middle quality between thefe extremes, the ordinary foil is beft. The principal part of good hufbandry confifts in a proper application of the compoft.

DUNKELD, a town of Perthfhire, in Scotland, formerly a bifhop's fee, fituated about twelve miles north of Perth.

DUNG-MEERS, in hufbandry, places where foils and dungs are mixed and digefted together. For this purpofe it is

 ufual

ufual to dig a pit fufficient to hold the ftock of foil the hufbandman is capable of making; and to prepare it at the bottom with ftone and clay, that it may hold water, or the moifture of the dung; and befides it fhould be fo fituated that the finks and drips of the houfes and barns may run into it. Into this pit they caft refufe fodder, litter, dung, weeds, &c. where they lie and rot together till the farmer have occafion for it. Where fuch a pit is wanting, it is proper to cover the dung with turf, or other ftuff, to prevent the fun and wind from drawing off its virtues.

DUNKIRK, a port town of the french Netherlands: eaft long. 2° 20′, and north lat. 51°.

DUNLIN, in ornithology, a fmall fpecies of fnipe, with the breaft and throat white, the belly black fpotted with white, and the upper part of the body red variegated with pretty large black fpots.

DUNNEGAL, the capital of a county of the fame name in Ireland, fituated on a bay, to which it likewife gives name: weft lon. 8° 22′, and north lat. 54° 35′.

DUNNINGTON, a market-town of Lincolnfhire, about twenty-three miles fouth-eaft of Lincoln.

DUNS, a market-town of Scotland, twelve miles weft of Berwick upon Tweed.

DUNSTABLE, a market-town, fifteen miles fouth of Bedford, and thirty north-weft of London.

DUNWICH, a borough of Suffolk, forty miles eaft of Bury.

It fends two members to parliament.

DUO, in mufic, a fong or compofition to be performed in two parts only, one fung, the other played on an inftrument, or by two voices.

Duo is alfo when two voices fing different parts, as accompanied with a third, which is a thorough bafs. It is feldom that unifons and octaves are ufed in duos, except at the beginning and end.

DUODENUM, in anatomy, the firft of the fmall guts, fo called from its length, which is about twelve fingers breadth. It has its origin at the pylorus, or right orifice of the ftomach; from which afcending a little, it afterwards defcends again, and towards its end reafcends, and runs tranfverfely towards the left kidney: at the diftance of three or four fingers from the pylorus it receives, at one prominent hiatus or mouth, the choledochic and pancreatic ducts, which difcharge their refpective liquors into it. The coats of the duodenum are thicker than thofe of any other of the fmall guts, and its cavity is alfo greater than that of any of them. Near its origin it has no valves, nor rugæ or wrinkles; but in its continuation it has very numerous and remarkable ones, called by authors juga. It has alfo the glands of Brunnerus in great number, which ferve for the fecreting of a thin aqueous fluid: and it receives an artery from the cœliac, and a vein from the porta.

DUPLE, among mathematicians, an epithet applied to a ratio, where the antecedent term is double the confequent, or where the exponent of the ratio is 2: thus the ratio of 8 to 4 is a duple ratio.

Sub-DUPLE RATIO is juft the reverfe of the former, or as 1 to 2. Such is 4 to 8, or 6 to 12.

DUPLICATE, among lawyers, denotes a copy of any deed, writing, or account. It is alfo ufed for the fecond letters patent, granted by the lord chancellor in a cafe wherein he had before done the fame. Alfo a fecond letter written and fent to the fame party and purpofe as the former, for fear of the firft's mifcarrying, is called a duplicate.

DUPLICATE PROPORTION, or RATIO, is a ratio compounded of two ratios: thus, the duplicate ratio of a to b, is the ratio of $a\,a$ to $b\,b$, or of the fquare of a to the fquare of b. Hence the duplicate ratio ought to be well diftinguifhed from double.

In a feries of geometrical proportionals, the firft term to the third is faid to be in a duplicate ratio of the firft to the fecond: thus in 2, 4, 8, 16, &c. the ratio of 2 to 8 is duplicate of that of 2 to 4, or as the fquare of 2 to the fquare of 4. Duplicate ratio is therefore the proportion of fquares, as triplicate is of cubes, &c. and the ratio of 2 to 8 is faid to be compounded of that of 2 to 4, and of 4 to 8.

DUPLICATION, in general, fignifies the doubling of any thing, or multiplying of it by 2: alfo the folding of any thing back again on itfelf.

The duplication of a cube is a problem famous in antiquity: it was propofed by the oracle at Delphos, as a means to ftop the plague, to double Apollo's altar, which was cubical.

The difficulty of the problem confifts in this, to find the fide of a cube that fhall be double in folidity to a given cube; which is only to be folved by finding two mean proportionals between the fide of the given

given cube and double that ſide. Thus, if the given ſide be repreſented by a, its double by b, and the ſide ſought by y; we ſhall have $aa : yy : : y : b$; and making $z = \frac{yy}{a}$, it will be $a : z : : y : b$. So that y, the ſide of the cube ſought, is the ſecond of two mean proportionals between a and b.

DUPLICATURE, among anatomiſts, a term uſed to denote the folds of any membrane, or veſſel: thus we ſay, the duplicatures of the inteſtines, peritonæum, &c. See the article INTESTINES.

DUPONDIUS, in antiquity, the weight of two pounds: alſo a piece of money equal to two as's in value. See AS.

DURA MATER, in anatomy, one of the membranes, or menynges, as they are called, which ſurround the brain. See the article BRAIN.

It is a robuſt and thick membrane, compoſed of tendinous fibres, and ſituated immediately under the cranium: its figure and magnitude correſpond exactly to thoſe of the brain. It adheres every where to the ſcull, only more laxly on the upper part than elſewhere: it adheres alſo, tho' not very firmly, to the parts placed under it. It receives arteries from the carotids, beautifully ramified in the manner of ſhrubs. Its veins are of two kinds, ſome as in other parts of the body, and others of a triangular figure, called ſinuſes, for carrying off the blood from the brain. It has nerves for ſenſation, from the fifth and ſeventh pair of the brain.

The dura mater has a motion, ſaid to be peculiar to itſelf, and of a muſcular kind: but it ſeems much more natural to ſuppoſe it owing to the pulſations of the arteries of the brain.

As to the uſes of this membrane, it ſerves in the place of a perioſteum to the internal parts of the ſcull; alſo to defend the brain by its proceſſes, to prevent the compreſſion of its parts; and by its ſinuſes to give warmth to the brain.

DURANCE, a river of France, which falls into the Rhone, a little below Avignon.

DURANTA, in botany, a genus of the didynamia-angioſpermia claſs of plants; the flower is formed of a ſingle petal, with a cylindrical tube and ringent mouth, the upper limb of which is oval, erect, and hollow; and the lower one divided into three parts: the fruit is a roundiſh unilocular berry, covered with the cup: the ſeeds are four, and of an angular figure.

DURATION, an idea which we get by attending to the fleeting and perpetually periſhing part of ſucceſſion; the idea of ſucceſſion being acquired by reflecting on that train of ideas which conſtantly follow one another in our minds, as long as we are awake. The ſimple modes of duration are any different lengths of it whereof we have diſtinct ideas, as hours, days, years, time, eternity, &c.

Duration, as marked by certain periods and meaſures, is what we moſt properly call time. See the article TIME.

DURATION *of action*, according to Ariſtotle, is confined to a natural day in tragedy; but the epopoeia, according to the ſame critic, has no fixed time.

DURATION *of an eclipſe*. See ECLIPSE.

Scruples of half DURATION. See the article SCRUPLE.

DURESSE, in law, is where a perſon is wrongfully impriſoned, or reſtrained of his liberty, contrary to law; or is threatened to be killed, wounded, or beaten, till he executes a bond, or other writing.

Any bond, deed, or other obligation, obtained by dureſſe, will be void in law; and in an action brought on the execution of any ſuch deed, the party may plead that it was brought by dureſſe. A deed muſt be avoided by ſpecial pleading, in theſe caſes; for the party cannot plead to it, *non eſt factum*, becauſe it is his deed.

DURHAM, a city and county, in the north of England, ſituated on the river Were, fourteen miles ſouth of Newcaſtle: weſt lon. 1° 12′, and north lat. 54° 50′.

The city of Durham is the ſee of a biſhop, and ſends two members to parliament.

DUSSELDORP, a city of Germany, ſituated on the eaſtern ſhore of the Rhine, twenty miles north of Cologn: eaſt lon. 6° 20′, and north lat. 51° 15′.

DUST is nothing elſe but dry earthy particles, reduced to a fine light powder.

Duſt and ſand will ſometimes get into horſes mouths, and make them loſe their appetites; in which caſe it is proper to give them bran, well moiſtened with water, to cool and refreſh their mouths and tongues.

The Hebrews, when they mourned, put duſt or aſhes upon their heads; and in their afflictions they ſat down in the duſt, and threw themſelves upon the ground.

DUTCHY, in geography, an appellation given to the dominions of a duke. See the article DUKE.

DUTCHY-

DUTCHY-COURT, a court of the dutchy-chamber of Lancaſter, held at Weſtminſter, before the chancellor of the ſame, for matters concerning the lands and franchiſes of that dutchy. See the article CHANCELLOR.

The proceedings in this court are by engliſh bill, as in chancery. Gwyn ſays, that this court grew out of the grant of king Edw. III. who gave the dutchy to John of Gaunt, and endowed it with royal rights and privileges: ſeveral others of our antient kings likewiſe ſeparated this dutchy from the crown, and ſettled it in the natural perſons of themſelves and their heirs; though, in ſucceeding times, it was united to the crown again.

DUTY, in general, denotes any thing that one is obliged to perform.

DUTY, in polity and commerce, ſignifies the impoſt laid on merchandizes, at importation or exportation, commonly called the duties of cuſtoms; alſo the taxes of exciſe, ſtamp-duties, *&c.* See the articles CUSTOMS, EXCISE, *&c.*

The principles on which all duties and cuſtoms ſhould be laid on foreign merchandizes, which are imported into theſe kingdoms, are ſuch as tend to cement a mutual friendſhip and traffic between one nation and another; and, therefore, due care ſhould be taken in the laying of them, that they may anſwer ſo good an end, and be reciprocal in both countries: they ſhould be ſo laid as to make the exports of this nation at leaſt equal to our imports from thoſe nations wherewith we trade, ſo that a balance in money ſhould not be iſſued out of Great Britain, to pay for the goods and merchandizes of other countries: to the end that no greater number of our landholders and manufacturers ſhould be deprived of their revenues ariſing from the product of the lands, and the labour of the people, by foreign importations, than are maintained by exportation to ſuch countries. Theſe are the national principles on which all our treaties of commerce with other countries are to be grounded.

To ſhew, ſays the late ſir Matthew Decker, how exciſes, cuſtoms, and ſalt-duties increaſe the expence of the people, and conſequently ruin our trade, the following account may not be improper.

Firſt the duties themſelves. The net produce of the taxes following, was, before the laſt war except one, computed to be, one year with another, as under:

Exciſe, about	£. 2,800,000
Cuſtoms, about	1,700,000
Salt, about	150,000
	4,650,000
The charges of raiſing thoſe duties are about 10 *per cent.*	465,000
Net produce	5,115,000

Secondly, the advanced price of thoſe goods the above duties are laid on. Experience teaches us that a very ſmall duty laid on commodities, raiſes the price of them conſiderably to the conſumer, beyond the groſs duty. By the fees given to officers; by tradeſmens loſs of time in attending upon exciſemen, or at cuſtom-houſes; by taking away a quarter of our traders ſtocks for duties; and forcing them to take as great pains on one quarter of their ſtock laid out in goods, in order to live, as they would on the whole if duty free; by tradeſmens profits on the duty, and advances in all the hands that all taxed goods come through, to the conſumer; as for example, ſuppoſe there ſhould be no other tax but that on leather, let us ſee how many advances that would make on the price of ſhoes.

The grazier lays (1) on the beaſt he fats, his advanced price of ſhoes: he ſells to the butcher, who takes (2) his profit on the grazier's advanced price of the beaſt; and raiſes (3) on the hide his advanced price of ſhoes: he ſells to the tanner, whoſe journeymen raiſe (4) their wages, on account of the advanced price of ſhoes; the tanner pays (5) the tax of two pence per pound on the leather; takes (6) his profit on the before-mentioned five advances, and raiſes (7) his advanced price of ſhoes on the tanned hide; he ſells to the leather-cutter, who takes (8) his profit on the before-mentioned ſeven advances, and raiſes (9) on the hide he cuts, his advanced price of ſhoes; he ſells to the ſhoe-maker, whoſe journeymen raiſe (10) their wages, on account of their advanced price of ſhoes; the ſhoe-maker takes (11) his profit on the before-mentioned ten advances, and raiſes (12) on the ſhoes he makes, the advanced price of the ſhoes he wears; he ſells to the conſumer with all theſe twelve advances, highly magnified beyond the bare duty.

So much for the tax on leather only; but the grazier, butcher, tanner, leather-cutter, and ſhoe-maker, uſe ſoap; that ſoap, like leather, is taxed, and, like that leather-tax, muſt be raiſed; but that cauſed twelve advances on our ſhoes;

place

place therefore twelve advances more on ſhoes, for the ſoap-tax. Theſe tradeſmen uſe candles; twelve advances more for the tax on them; and the ſame for every other tax on neceſſaries. All which duly conſidered, might be computed at above *cent. per cent.* on the groſs produce of the duties; but though the large duties cauſe ſome farther advance on all the goods they are laid on, charged with profit upon profit, through every hand they paſs; yet as they keep not pace with the ſmall duties, and as all calculations appear fair when moderate, let us abate in the advances, and ſet them down only at 50 *per cent.* 2,557,500.

The amount of the advanced price of the goods theſe duties are laid on, 7,672,500 l. Let us ſee how this 7,672,500 l. circulates through the people, advances the prices of our goods, and conſequently ruins our trade. Firſt, this dearneſs of all neceſſaries, which raiſe the firſt coſt of goods, muſt advance the price of all labour.

The Spectator, n° 200. computes, that the people without property, who work for their daily bread, conſume two thirds of our cuſtoms and exciſes, and therefore they pay two thirds of them and their conſequences. As theſe people live but from hand to mouth, whatever is laid on them they muſt, therefore, ſhift off, or they cannot live; and ſince theſe various taxes have been projected, they muſt earn enough, when they do work, to pay the taxes, the advanced price of taxed goods, and the advanced prices of all other neceſſaries, *viz.* meat, bread, cloathing, or whatever they can uſe, not only for the conſumption of the days they are employed, but for thoſe alſo they are not: therefore they are the cauſe of raiſing the wages of the working people two thirds of 7,672,500 l. the amount of the advanced price of the goods the above duties are laid on, which make 5,115,000 l.

Secondly, the dearneſs of all neceſſaries forces the maſter-tradeſman to raiſe on their cuſtomers the taxes and advances on their conſumption.

The ſame author allows one third conſumption of our cuſtoms and exciſes to people with property; but as thoſe may be divided into two claſſes, *viz.* thoſe in trade, and thoſe out of trade, and the proportion conſumed by each not being aſcertained by any author, they are computed by ſir Matthew at half and half; therefore the maſter-tradeſmen, or people with property in trade, *viz.* merchants, manufacturers, mechanics, farmers, wholeſale dealers, and retailing ſhopkeepers, muſt each lay on the goods they conſume, whether food, cloathing, or utenſils, their one ſixth conſumption of 7,762,500 l. the amount of the advanced price of the goods the above duties are laid on, makes 1,278,750 l.

Thirdly, tradeſmens paying advanced prices on their goods, muſt have advanced profits; for whether they lay out their ſtocks of money on goods that bear their natural value only, or goods that double their value by taxes, ſtill a living profit muſt be obtained in the ſtocks they employ. For the wages of the manufacturer, the mechanic, the labourer, and the expence of the maſter-tradeſman, being of neceſſity raiſed, the firſt coſt of goods muſt be ſo too; and conſidering the various tradeſmens hands that goods paſs thro', from the workman or labourer, to the conſumer, charged with profit upon profit by each of them, the advance thereby made, may, at a moderate rate be computed at 50 *per cent.* to the conſumer on the above two articles, which raiſe the firſt coſt of goods, and makes 3,196,875 l.

People with property, out of trade, their ſixth of 7,672,500 l. the amount of the advanced price of the goods the above duties are laid on, makes 1,278,750 l. and the total advance is 10,869,375 l.

This is part of the amount of the conſequences of raiſing 4,650,000 l. for the government, by our preſent manner of taxing goods.

Our other taxes are, the land-tax; the groſs produce, at 4 s. in the pound, is about 1,960,000 l.

The ſtamps, windows, poſt office, &c. their computed groſs produce about 500,000 l.

The poor's tax is computed, on a middling rate, to equal the land-tax, but muſt be much more when trade is reduced, and the price of proviſions high: however, to reckon it at no more than the land-tax, or 1,960,000 l. General amount of all our taxes, and part of their conſequences, before the laſt war except one, 15,289,375 l.

Let us now ſee the amount of our taxes with regard to our expences: The Britiſh Merchant computes our people at ſeven millions, and their expences at 7 l. per head; but as neceſſaries are grown dearer ſince the year 1713, when he wrote, and the number of people increaſed, let us compute the people at eight millions, and their expences at 8 l. per head, which makes our total expences annually 64,000,000 l.

64,000,000 l. of which the people pay for the taxes and their consequences, as above, 15,289,375 l. which being subtracted, their expences, if untaxed, would be only 48,710,625 l.

15,289,375 l. charged on 48,710,625 l. is a tax of above 31 *per cent.* on the expences of the people, which must add a prodigious artificial value to our goods, consequently render them less saleable, and ruin our trade.

If it be admitted that foreigners pay on that consumption a great portion of our taxes, for what goods they take of us; yet if that was originally intended, and expected to continue the same, as at the first laying on our taxes, it will be the strongest argument to the contrary; for as our taxes on necessaries are proved to be so burdensome and extensive, by raising the prices of our goods, foreigners take less of them yearly; and when the demand is reduced, the people having less work, find less money to pay, and yet have their taxes proportionably increased on them as they lose their trade: for as the government abates neither expences or taxes, and, if one method of taxing fails, another is tried, what foreigners cease to pay, we must: or, in other words, the less trade and money, the more taxes; and the more our taxes are, the less trade and money we must expect.

Through the whole of this work, we have, under the several articles, as they occurred, generally annexed the principal duties which belong to each as a branch of the royal revenue; and for further information upon this head, we refer the reader to what is said under the articles CUSTOMS, COMPANY, DRAWBACK, EXCISE, &c.

In Spain, the duties of exportation and importation amount to about 5 *per cent.* of the value of the goods. In Portugal, the duties of importation on all kinds of goods are at the rate of 18 *per cent*, excepting silks, which are at 13 *per cent.* for exportation the duties are only 6 *per cent.* The duties for exportation and importation in Holland, are nearly alike, being about the rate of 5 *per cent.* In Muscovy they are the same, *viz.* 5 *per cent.* At Hamburgh and Bremen the duties are only 1 *per cent.* and at Lubeck but ½ *per cent.* At Venice the duties are 6 ½ *per cent.* for importation, and the duties of exportation are about 9 *per cent.* At Leghorn the duties are much the same as at Venice.

In Constantinople, Smyrna, Aleppo, and the other ports of the Levant, the duties of exportation and importation, being nearly the same, are at 3 *per cent.* In Cairo, Alexandria, and other cities of Egypt, the duties on goods brought in ships from Europe, are at 20 *per cent.* but the duties on the goods brought by the caravans from Asia, are arbitrary, and always high: they pay no duty on exportation, besides the custom-house fee, which is only 1½ *per cent.*

DUTY, in the military art, is the exercise of those functions that belong to a soldier; with this distinction, that mounting guards and the like, where there is no enemy directly to be engaged, is called duty; but their marching to meet and fight an enemy is called going on service.

DUUMVIRATE, an office or dignity of the duumviri. See the next article.

The duumvirate lasted till the year of Rome 388, when it was changed into a decemvirate.

DUUMVIRI, in roman antiquity, a general application given to magistrates, commissioners, and officers, where two were joined together in the same function.

DUUMVIRI CAPITALES were the judges in criminal causes: from their sentence it was lawful to appeal to the people, who only had the power of condemning a citizen to death. These judges were taken from the body of the decuriones; they had great power and authority, were members of the public council, and had two lictors to walk before them.

DUUMVIRI MUNICIPALES, were two magistrates in some cities of the empire, answering to what the consuls were at Rome: they were chosen out of the body of the decuriones; their office lasted commonly five years, upon which account they were frequently termed *quinquinales magistratus.* Their jurisdiction was of great extent: they had officers walking before them, carrying a small switch in their hands; and some of them assumed the privilege of having lictors, carrying axes and the fasces, or bundles of rods, before them.

DUUMVIRI NAVALES were the commissaries of the fleet, first created at the request of M. Decius, tribune of the people, in the time of the war with the Samnites. The duty of their office consisted in giving orders for the fitting of ships, and giving their commissions to the marine officers, &c.

DUUMVIRI SACRORUM were magistrates created by Tarquinius Superbus, for the performance

performance of the sacrifice, and keeping of the sibyls books. They were chosen from among the patricians, and held their office for life: they were exempted from serving in the wars, and from the offices imposed on the other citizens, and without them the oracles of the sibyls could not be consulted.

DUYVELAND, or DIVELAND, one of the islands of Zealand, in the United Provinces, lying eastward of Schonen, from which it is only separated by a narrow channel.

DWAL, or DWALE, in heraldry, the herb nightshade, used by such as blazon with flowers and herbs, instead of metals and colours, for sable or black.

DWARF, in general, an appellation given to things greatly inferior in size to that which is usual in their several kinds: thus there are dwarfs of the human species, dwarf-dogs, dwarf-trees, *&c.*

The Romans were so passionately fond of dwarfs, that they often used artificial methods to prevent the growth of boys designed for dwarfs, by inclosing them in boxes, or by the use of tight bandages. In Italy, even at present, they wash young puppies every day with astringent liquors, in order to prevent their growth by hardening the parts.

DWARF FRUIT-TREES are propagated by grafting them on a quince-stock, about six inches above the ground; and when the bud is shot so far as to have four eyes, it must be stopped, to give rise for lateral branches, for which purpose the uppermost eye should always be left outwards. Apple, pear, plum, and cherry-trees are thus formed into dwarfs, but the summer and autumn pears are found to succeed best. As to the planting of dwarf-trees, they should be set at twenty-five feet square distance, and the ground between sown or planted for kitchen use while the trees are young, only keeping at some distance from their roots: stakes also should be fixed all round them, to which the branches may be nailed with list, and thereby trimmed in an horizontal direction, and prevented from crossing one another.

DWINA, the name of two large rivers, one of which rises in Lithuania, and, dividing Livonia from Courland, falls into the Baltic sea a little below Riga: the other gives name to the province of Dwina, in Russia, discharging itself into the White sea, a little below Archangel.

DYADIC ARITHMETIC, the same with binary. See the article BINARY.

DYE, in architecture, any square body, as the trunk, or notched part of a pedestal; or it is the middle of the pedestal, or that part included between the base and the corniche, so called because it is often made in the form of a cube or dye. See the articles CORINTHIAN ORDER, DORIC ORDER, *&c.*

DYE is also used for a cube of stone placed under the feet of a statue, and over its pedestal, to raise and shew it the more.

DYER, a person who professes the art of dying all manner of colours. See DYEING.

All persons occupying the trade of dyeing woollen manufactures within the city of London, or ten miles round it, shall be subject to the inspection of the company of dyers of London; and the master, wardens, and court of assistants of the said company, may appoint searchers within the said limits; and out of these limits, justices, at their quarter-sessions, may appoint such searchers, who taking to their assistance a constable, or other peace-officer, may, at all seasonable times, enter the shop or work-house of any person using the trade of dyeing, and search all cloths or other woollen goods to be dyed black or blue; and any person opposing, forfeits 10 l.

Every person dyeing cloths, *&c.* maddered, and not woaded, shall, before delivery, fix a seal of lead to them, with the letter M, on forfeiture for every yard, *&c.* 3 s. 4 d. Any person, within England, Wales, or Berwick, dying black any baize or other woollen goods, as madder-blacks, not being dyed throughout with woad, indigo, and madder only, or dyeing any cloths, long-ells, *&c.* for woaded blacks, not being woaded throughout, shall forfeit for every long Bocking-baize, containing seventy yards, 44 s. For every Colchester-baize, containing thirty-five yards, 22 s. and so in proportion for other baize. For every cloth dyed black, not being woaded throughout, containing forty-four yards, 40 s. All woollen goods truly maddered black, shall be marked with a red and blue rose; and all woollen goods truly woaded black, with a blue rose; and any person counterfeiting the said marks, or fixing such to any goods falsely dyed, for maddered or woaded blacks, forfeits 4 l. for every piece so marked. Any person using logwood in dying blue, shall forfeit 40 s. for every piece so dyed containing forty-four yards.

DYER *of leather*, is an artificer who colours skins, either on the one side, or on the

other,

other, in the cold or hot dye. See the articles COLOUR and LEATHER.

Hat-DYER is said of master-hatters, who give themselves particularly to the dyeing of hats. Though there be but one freedom in this company, the masters seem to be divided into three distinct professions, the one making the hats, the other dyeing them, and a third fitting them up, and selling them. See HAT.

DYEING, the art of giving a lasting colour to silks, cloths, and other substances, whereby their beauty is much improved, and value enhanced.

This art depends chiefly on three things, *viz.* 1. Disposing the surface of the stuffs to receive and retain the colours, which is performed by washing them in different lyes, digesting, beating them, *&c.* in which human urine putrified, a sharp salt of ashes, divers soaps, and galls of animals, are of principal use; by means whereof the viscuous gluten of the silk-worms naturally adhering to their threads, is washed and cleansed from them, and thus they become fitted gradually to imbibe the colours. By these also the greasy foulness adhering to wool and flax is scoured off. See CLOTH.

2. So to grind the colours, as that they may enter the body duly prepared, and preserve their brightness undiminished. See COLOUR and COLOURING.

3. The third consists in having beautiful colours.

According to Sir W. Petty's account of what is done in particular trades by the art of dyeing. 1. There is a whitening of wax, and several sorts of linen and cotton cloths, by the sun, air, and reciprocal effusions of water. 2. Colouring of wood and leather, by lime, salt and liquors, as in stoves, canes, and marble leathers. 3. Colouring of paper, *viz.* the marbled paper, by distempering the colours with ox-gall, and applying them upon a stiff gummed liquor. 4. Colouring, or rather discolouring, the colours of silks, tiffanies, *&c.* by brimstone. 5. Colouring of several iron and copper-works into black with oil. 6. Colouring of leather into gold-colour, or rather silver leaves into gold by varnishes, and in other cases by urine and sulphur. 7. Dyeing of marble and alabaster, with heat and coloured oils. 8. Colouring silver into the brass-colour, with brimstone or urine. 9. Colouring the barrels and locks of guns into blue and purple, with the temper of small-coal heat. 10. Colouring of glass (made of sands, flints, *&c.*) as also of crystals and earthen ware, with the rusts and solutions of metals. 11. The colouring of live hair, as in Poland, horse and man's hair: as also the colouring of furs. 12. Enameling and annealing. 13. Applying colours, as in the printing of books and pictures, and as in making of playing cards, being each of them performed in a different way. 14. Gilding and tinning with mercury, block-tin, sal armoniac. 15. Colouring of metals, as copper with calamy, into brass, and with zink or spelter into a golden colour, or into a silver one with arsenic; and of iron into a resemblance of copper with hungarian vitriol. 16. Making painters colours by preparing of earth, chalk, and slates; as in umber, ochre, cullen-earth, *&c.* as also out of calces of lead, as ceruse and minium; by sublimates of mercury and brimstone, as in vermilion; by tinging whole earths variously, as in verdeter, and some of the lakes; by concrete juices, or fæculæ, as in gambogium, indigo, pinks, sap-green, and lakes; as also by rusts, as in verdigrease, *&c.* 17. The applying these colours by the adhesion of ox-gall, as in the marble paper aforesaid; or by gum-water, as by limning; or by clammy drying oils, such as the oils of linseed, nuts, *&c.* 18. The watering of tabbies. 19. The colouring of wool, linen, cotton, silk, hair, feathers, horn, leather, and the threads and webs of them with woods, roots, herbs, seeds, leaves, salts, limes, lixiviums, waters, heats, fermentations, macerations, and other great variety of management: an account of all which is a short history of dyeing.

The materials used in the art of DYEING, are iron and steel, or what is produced from them, in all true blacks, called spanish blacks, though not in flanders-blacks, *viz.* they use copperas, steel filings, and slippe; they also use pewter for Bow-dye scarlet, *viz.* they dissolve bars of pewter in aquafortis; litharge is also used by some, though acknowleged by few to add weight to dyed silk. Antimony is much used to the same purpose. Arsenic is used in crimson upon pretence of giving lustre, although those who pretend not to be wanting in giving lustre to their silks, disown its use. Verdigrease is also used by linen-dyers in their yellow and greenish colours; though, of itself, it strikes no deeper colour than that of a

pale

pale ſtraw. Of mineral ſalts uſed in dyeing, the chief is alum; the true uſe whereof ſeems to be in regard to the fixation of colours. The next mineral ſalt is ſalt-petre, not uſed by antient dyers, and but by few of the modern: nor is it yet uſed but to brighten colours, by back-boiling of them, for which argol is more commonly uſed: lime is much uſed in working blue-vats.

Of the animal family are uſed cochineal, urine of labouring men kept till it be ſtale and ſtinking, honey, yolks of eggs, and ox gall; the uſe of the urine is to ſcour, and help the fermenting and heating of woad; and is uſed alſo in blue-vats inſtead of lime: it diſchargeth the yellow, and therefore is uſed to ſpend weld withal.

Dyers uſe two ſorts of water, *viz.* river and well-water; the laſt, which is harſh, they uſe in reds and other colours wanting reſtringency, and in dyeing materials of the ſlacker contextures, as in callicoe, fuſtian, and the ſeveral ſpecies of cotton-works; but is not good for blues, and makes yellows and greens look ruſty. River-water is more fat and oily, and is therefore uſed in moſt caſes, and muſt be had in great quantities for waſhing and rinſing their cloths after dyeing. Water is called by dyers white liquor; but a mixture of one part bran, and five of river-water boiled an hour and put into leaden ciſterns to ſettle, is what they call liquor abſolutely.

Gums have been uſed by dyers about ſilk, *viz.* gum arabic, tragacanth, maſtic, dragon's blood. Theſe tend little to the tincture, any more than gum in writing-ink, which only gives it a conſiſtence; ſo gum may give the ſilk a gloſſineſs; and, laſtly, to increaſe the weight.

The three peculiar ingredients for black are copperas, filings of ſteel, and ſlippe: the reſtringent binding materials are alder-bark, pomegranate-peels, walnut-rinds and roots, oakenſapling-bark, and ſaw-duſt of the ſame, crab-tree-bark, galls, and ſumac.

The ſalts are alum, ſalt-petre, ſal armoniac, pot-aſhes, and ſtone-lime; among which urine may be enumerated as a liquid ſalt.

The liquors are well and river water, urine, aquavitæ, vinegar, lemon-juice, aquafortis, honey, and molaſſes.

Ingredients of another claſs are bran, wheaten-flour, yolks of eggs, leaven, cummin-ſeed, fenugreek-ſeed, agaric and ſenna.

The ſmectics, or abſterſives, are fuller's earth, ſoap, linſeed-oil, and ox-gall.

The metals and minerals are pewter, verdigreaſe, antimony, litharge, and arſenic.

The colourings are of three ſorts, *viz.* blue, yellow, and red; of which logwood, old fuſtic, indigo, and madder, are the chief.

General obſervations upon DYEING.

1. All materials which of themſelves do give colour, are either red, yellow, or blue; ſo that out of them, and the primitive fundamental colour white, all that great variety which we ſee in dyed ſtuffs doth ariſe.

2. That few of the colouring materials, as cochineal, ſoot, wood-wax, woad, *&c.* are in their outward and firſt appearance of the ſame colour, which by the ſlighteſt diſtempers and ſolutions in the weakeſt menſtrua, they dye upon cloth, ſilk, *&c.*

3. That many of them will not yield their colours without much grinding, ſteeping, boiling and fermenting, or corroſion by powerful menſtrua, as red-wood, weld, woad, arnotto, *&c.*

4. That many of them will of themſelves give no colouring at all, as copperas or galls, or with much diſadvantage, unleſs the cloth or other ſtuff to be dyed be as it were firſt covered, or incruſtated with ſome other matter, though colourleſs aforehand, as madder, weld, braſil, with alum.

5. That ſome of them, by the help of other colourleſs ingredients, do ſtrike different colours from what they would of themſelves, as cochineal, brazil, *&c.*

6. That ſome colours, as madder, indigo, and woad, by reiterated tinctures, will at laſt become black.

7. That although green be the moſt frequent and moſt common of natural colours, yet there is no ſimple ingredient now uſed alone to dye green with upon any material; ſap-green being the neareſt, which is uſed by country people.

8. There is no black thing in uſe which dyes black, though both the coal and ſoot of moſt things burnt or ſcorched be of that colour, and the blacker, by how much the matter before being burnt was whiter, as in ivory-black.

9. The tincture of ſome dyeing ſtuffs will fade even with lying, or with the air, or will ſtain with water only, but very much with urine, vinegar, *&c.*

10. Some of the dyeing materials are uſed to bind and ſtrengthen a colour; ſome to brighten it; ſome to give luſtre to the

ftuff; fome to difcharge and take off the colour, either in whole or in part; and fome out of fraud, to make the material dyed, if coftly, heavier.

11. That fome dyeing ingredients, or drugs, by the coarfenefs of their bodies, make the thread of the dyed ftuff feem coarfer; and fome, by fhrinking them, fmaller; and fome, by fmoothing them, finer.

12. Many of the fame colours are dyed upon feveral ftuffs with feveral materials, as red-wood is ufed in cloth, not in filks; arnotto in filks, not in cloth, and may be dyed at feveral prices.

13. The fcouring and wafhing of ftuffs to be dyed, is done with fpecial materials, as fometimes with ox-galls, fometimes with fuller's-earth, and fometimes foap; this latter being, in fome cafes, pernicious, where pot-afhes will ftain, or alter the colour.

14. Where great quantities of ftuffs are to be dyed together, or where they are to be done with any fpeed, and where the pieces are very long, broad, thick, or otherwife, they are to be differently handled, both in refpect to the veffels and ingredients.

15. In fome colours and ftuffs the tingent liquor muft be boiling, in other cafes, blood-warm, and in fome it may be cold.

16. Some tingent liquors are fitted for ufe by long keeping, and in fome the virtues wear away by the keeping.

17. Some colours or ftuffs are beft dyed by reiterated dippings in the fame liquor, fome by continuing longer, and others a leffer time therein.

18. In fome cafes, the matter of the veffel wherein the liquors are heated, and the tincture prepared, muft be regarded, as the kettles muft be pewter for Bow-dye.

19. There is little reckoning made how much liquor is ufed in proportion to the dying drugs, it being rather adjufted to the bulk of the ftuffs, as the veffels are to their breadth; the quantity of dyeing drugs being proportioned both to the colour, higher or lower, and to the ftuffs; as likewife the falts are to the dying drugs.

Concerning the weight that colours give to filk, (in which it is moft taken notice of, being fold by weight, and a commodity of great price) it is obferved that one pound of raw filk lofeth four ounces by wafhing out the gums, and the natural fordes. That the fame fcoured filk may be raifed to above thirty ounces from the remaining twelve, if it be dyed black with fome materials. Of a thing very ufeful in dyeing, efpecially of black, nothing increafes weight fo much as galls, by which black filks are reftored to as much weight as they loft by wafhing out their gum: nor is it counted extraordinary that blacks fhould gain about four or fix ounces in the dyeing, upon each pound. Next to galls, old fuftic increafes the weight about $1\frac{1}{2}$ in 12; madder, about one ounce; weld, half an ounce. The blue vats in deep blues of the fifth ftall, give no confiderable weight; neither doth logwood, cochineal, nor even copperas, where galls are not: flippe adds much to the weight, and giveth a deeper black than copperas itfelf, which is a good excufe for the dyers that ufe it.

DYEING *of wool and woollen manufactures.* For black in woollen manufactures, it is begun with a ftrong decoction of woad and indigo, that communicate a deep blue; after which the ftuffs being boiled with alum and tartar, or pot-afh, are to be maddered with common madder, then dyed black with Aleppo-galls, copperas, and fumac, and finifhed by black-boiling in weld. Wools for tapeftry are only to be woaded, and then put in black. For fcarlet, wool and woollen manufactures are dyed with kermes and cochineal, with which may alfo be ufed agaric and arfenic. Crimfon-fcarlet is dyed with cochineal, maftic, aquafortis, fal armoniac, fublimate, and fpirit of wine. Violet-fcarlet, purple, amaranth, and panfy-fcarlets, are given with woad, cochineal, indigo, braziletto, brazil, and orchal. Common reds are given with pure madder, without any other ingredient. Crimfon-reds, carnations, flame and peach-colours, are given, according to their feveral hues, with cochineal, maftic, without madder, or the like. Crimfon-red is prepared with roman alum with cochineal. Orange-aurora, brick-colour, and onion-peel colour, are dyed with woad and madder, mixed according to their feveral fhades. For blues, the dark are dyed with a ftrong tincture of woad; the brighter with the fame liquor, as it weakens in working. Dark browns, minims, and tan-colours, are given with woad, weaker in decoction than for black, with alum and pot-afhes, after which they are maddered higher than black: for tan-colours, a little cochineal is added. Pearl-colours are given with galls and copperas; fome are begun with walnut-tree roots, and finifhed with the former; though to make

make them more useful, they generally dip them in a weak tincture of cochineal. Greens are begun with woad, and finished with weld. Pale yellows, lemon-colour, and sulphur-colour, are given with weld alone. Olive colours of all degrees are first put in green, and taken down with soot, more or less, according to the shade that is required. Feulemort, hair-colour, musk, and cinnamon-colour, are dyed with weld and madder. Nacaret, or bright orange, is given with weld and goats hair boiled with pot-ashes.

DYEING *of silks*, is begun by boiling them in soap, *&c.* then scouring and washing them in water, and steeping them in cold alum water. For crimson, they are scoured a second time, before they are put into the cochineal-vat. Red crimson is dyed with pure cochineal mastique. Adding galls, turmeric, arsenic, and tartar, all put together in a copper of fair water, almost boiling: with these the silk is to be boiled an hour and a half, after which it is allowed to stand in the liquor till next day. Violet-crimson is given with pure cochineal, arsenic, tartar, and galls; but the galls in less proportion than in the former: when taken out, it is washed and put in a vat of indigo. Cinnamon-crimson is begun like the violet, but finished by back-boiling, if too bright, with copperas, and if dark, with a dip of indigo. Light blues are given in a back of indigo. Sky-blues are begun with orchal, and finished with indigo. For citron-colours, the silk is first alumed, then welded with indigo. Pale yellows, after aluming, are dyed in weld alone. Pale and brown aurora's, after aluming, are welded strongly, then taken down with rocou and dissolved with pot-ashes. Flame-colour is begun with rocou, then alumed, and afterwards dipped in a vat or two of brazil. Carnation and rose colours are first alumed, then dipt in brazil. Cinnamon-colour, after aluming, is dipt in brazil, and braziletto. Lead-colour is given with fustic, or with weld braziletto, galls and copperas. Black silks of the coarser sort, are begun by scouring them with soap, as for other colours; after which they are washed out, wrung, and boiled an hour in old galls, where they are suffered to stand a day or two: then they are washed again with fair water, wrung, and put into another vat of new galls; afterwards washed again, and wrung, and finished in a vat of black. Fine black silks are only put once into galls of the new and fine sort, that has only boiled an hour: then the silks are washed, wrung out, and dipped thrice in black, and afterwards taken down by back-boiling with soap.

The dyeing of thread is begun by scouring it in a lye of good ashes: afterwards it is wrung, rinsed out in river-water, and wrung again. A bright blue is given with braziletto and indigo: bright green is first dyed blue, then back-boiled with braziletto and verdeter, and lastly woaded. A dark green is given like the former, only darkening more before woading. Lemon and pale yellow is given with weld mixed with rocou. Orange isabella, with fustic, weld, and rocou. Red, both bright and dark, with flame-colour, *&c.* are given with brazil, either alone, or with a mixture of rocou. Violet, dry rose, and amaranth, are given with brazil, taken down with indigo. Feulemort and olive-colour are given with galls and copperas, taken down with weld, rocou, or fustic. Black is given with galls and copperas, taken down and finished with braziletto wood.

DYKE, or DIKE. See the article DIKE.

DYNAMICS signify properly the science of moving forces; but mathematicians, by this term, understand the science of the motion of such bodies as impel one another. See the article MOTION.

To dynamics may be referred the theory of the centers of rotation and oscillation, the laws of the motions of bodies; but particularly of the communication of motion. See CENTER, COMMUNICATION *of Motion*, and PERCUSSION.

This science is that part of mechanics which treats of the generation, or augmentation of powers, and is opposed to statics, which is the doctrine of the equilibrium of powers. See the articles MECHANICS and STATICS.

M. D'Alembert has published a treatise of dynamics.

DYNASTY, among antient historians, signifies a race or succession of kings of the same line or family: such were the dynasties of Egypt.

The Egyptians reckon thirty dynasties within the space of 36525 years; but the generality of chronologers look upon them as fabulous. And it is very certain, that these dynasties are not continually successive, but collateral.

DYSCRASY, among physicians, denotes an ill habit or state of the humours, as in the scurvy, jaundice, *&c.*

DYSENTERY, δυσεντερία, in medicine, a diarrhœa or flux, wherein the ſtools are mixed with blood, and the bowels miſerably tormented with gripes.

Dyſenteries are diſtinguiſhed into benign and malignant. The former continues longer, but proceeds more gently, and is leſs dangerous. The latter is not only of a contagious nature, but is alſo attended with ſome fatal ſymptoms, ſuch as a malignant fever, a defect of ſtrength, and exanthematous diſorders. It may likewiſe be obſerved, that dyſenteries are diſtinguiſhed into red and white: in the former, the humours evacuated are always bloody; but in the latter, ſanious, and mixed with carnous filaments and ulcerous ſhreds abraded from the coats of the inteſtines. The immediate cauſe of a dyſentery, according to the moſt received opinion, is ſeated in the inteſtines, and is a highly acrid humour, generated by ſummer fruits when unripe, fermenting with other juices, eſpecially thoſe of the bilious kind, and vellicating, corroding, and excoriating the nervous coats of the inteſtines. Others think it occaſioned by a certain ſpecific kind of miaſma, whoſe particular quality it is to ferment in the inteſtines, with the bile eſpecially, and then to corrode them. And others think that the genuine and moſt immediate cauſe which produces the ſevere gripes, and all the other train of ſymptoms in a dyſentery, is principally lodged in the blood-veſſels which ſurround the nervous coat of the inteſtines.

As to the prognoſtics, dyſenteries are dangerous to pregnant women, to old men and boys, to the ſcorbutic, the conſumptive, and the cachectic. When they begin with vomiting, ſucceeded with a hiccup, there is danger of an inflammation of the ſtomach. When clyſters are immediately returned, or the anus ſo obſtinately cloſed that nothing can be injected, it is a ſign of a palſy in the rectum. And when ſwallowing is attended with a murmuring noiſe, it ſhews the approach of a delirium, an inflammation of the fauces, aphthæ, or a palſy of the whole œſophagus. The common method of curing a dyſentery, is firſt to bleed, then to vomit with ipecacuanha, afterwards to purge with rhubarb, and, laſt of all, to give aſtringents. When the bowels are ulcerated, it will be of ſervice to inject clyſters, either of fat broth with the addition of venice-treacle, or the electuary of ſcordium, or Locatellus's balſam. Sydenham, after bleeding, preſcribes a paregoric at night, and the next morning a cathartic. Mr. Ray, from the information of Aubrey, ſays, that the fungous ſubſtance between the lobes of a walnut dried and powdered, and given in a moderate quantity of wine, cured the engliſh army of a dyſentery, when all other remedies failed. Juſſieu ſays, a thick yellow bark, called ſimaruba, has been found ſucceſsful in the cure of a dyſentery; and Kramer aſſures us, we may depend on the ſame effect from the decoction of common millet-ſeed. Another ſpecific is the vitrum antimonii ceratum, which has been in uſe for ſome time, but was kept a ſecret till it was communicated to the public by Dr. Young, of Edinburgh. The ordinary doſe for an adult is ten or twelve grains; and it has been found ſucceſsful where bleeding and vomits have been premiſed; and where they have not, it is beſt, ſays Dr. Pringle, to with-hold opium till the patient is both vomited and purged, and then it becomes neceſſary, to begin with ſmall doſes. As to the diet, the ſame author confines the ſick, in the beginning, to rice-gruel, panado, &c. and for drink, to rice or barley-water, or the white decoction. In the convaleſcent ſtate they are allowed meat, but no ſmall-beer, and never any milk, unleſs diluted with lime-water, it being obſerved, that milk by itſelf was apt to renew the gripes.

DYSERT, a parliament-town of Scotland, in the county of Fife, ſituated on the northern ſhore of the frith of Forth, about eleven miles north of Edinburgh: weſt longitude 3°, north latitude 56° 10′.

DYSOREXY, among phyſicians, denotes a want of appetite, proceeding from a weakly ſtomach. See APPETITE.

DYSPEPSY, a difficulty of digeſtion, for which phyſicians preſcribe bitters.

DYSPNOEA, a difficulty of breathing, uſually called aſthma. See ASTHMA.

DYSURY, δυσουρία, in medicine, a difficulty of making urine, attended with a ſenſation of heat and pain. It is diſtinguiſhed from a ſtrangury, as, in the laſt, the urine is voided by only a drop, as it were, at a time, but, however, with pain; and from an iſchury, as, in this diſorder, there is an almoſt total ſuppreſſion of urine. A dyſury conſtantly attends a virulent gonorrhœa, accompanies many other diſtempers as a ſymptom, and is frequently excited by very acrimonious medicines, and the external application



T. Jefferys sculp.

plication of cantharides. In a dyſury, emollient and mucilaginous medicines, as gum-arabic diſſolved in barley-water, emulſions and decoctions, with an addition of nitre, copious draughts of diluting fluids and camphor, are uſually preſcribed. See STRANGURY and ISCHURY.

DYTISCUS, WATER-BEETLE, in zoology, a genus of inſects of the order of the coleoptera, the antennæ of which are ſlender and ſetaceous, and their feet formed for ſwimming. See COLEOPTERA.

Authors enumerate a great many ſpecies of this animal, among which is the great water-beetle, the largeſt of all european beetles, being an inch and an half in length, and all over of a deep and ſomewhat gloſſy black. See plate LXXX. fig. 3. n° 1. N° 2, and n° 3. (*ibid.*) repreſent two other ſpecies of this genus.



E.

E, the fifth letter of the alphabet, and ſecond vowel, has different pronunciations in moſt languages. The greeks have their eta η, and epſilon ε, or long and ſhort *e*. The French have their *e* open, pronounced much like our *a* in the words *face* and *make*; their *e* maſculine, pronounced not unlike our *y* at the end of words, as *liberté*, *liberty*; their *e* feminine, or mute, very weakly if at all pronounced, added generally at the end of words, either to diſtinguiſh the feminine gender, or lengthen the ſyllable; and their *e* before an *m* or *n*, which ſounds like our *a* in the word *war*: theſe are all exemplified in the words *empechée* or *enfermée*. In engliſh there are three kinds of *e*, *viz.* the open or long *e*, as in the words *bear*, *wear*; the cloſe or ſhort *e*, as in *wet*, *kept*; and mute *e*, which ſerves to lengthen the ſyllable, as in *love*, *came*, *&c.*

As a numeral, E ſtands for 250. In muſic, it denotes the tone *e-la-mi*. In the calendar it is the fifth of the dominical letters. And in ſea-charts it diſtinguiſhes all the eaſterly points: thus, E. alone denotes eaſt, E. by S. and E. by N. eaſt by ſouth and eaſt by north. See the article CHARACTER.

EADISH, or EDDISH, among farmers. See the article EDDISH.

EAGLE, *aquila*, in ornithology, the engliſh name of ſeveral ſpecies of falco. See the article FALCO.

The iron-coloured eagle with a yellow cera, called by authors chryſaëtos, or golden eagle, is a large and terrible bird of prey, about the ſize of a turkey, frequent in many parts of Europe; the tongue of which is in ſhape like that of the human ſpecies. The brown or cheſnut-coloured eagle, with a blue cera, is likewiſe a very bold and fierce bird.

The chryſaëtos, or common eagle, is very rapacious; it will ſeize on lambs, and, during the time of its having young, ſcarce any thing is ſafe from it. See plate LXXXI. fig. 1.

The white-tailed eagle, brought from Hudſon's bay, differs from the common kind in the colour of its tail, which is white, only that the tips of the feathers are black, or dark brown; the breaſt too is ſpotted with triangular ſpots. See plate LXXXI. fig. 2.

To theſe may be added the pygargus and haliætus. See the articles PYGARGUS and HALIÆTUS.

In heraldry, the eagle is accounted one of the moſt noble bearings in armoury, and, according to the learned in this ſcience, ought to be given to none but ſuch as greatly excel in the virtues of generoſity and courage, or for having done ſingular ſervices to their ſovereigns; in which caſes they may be allowed a whole eagle, or an eagle naiſſant, or only the head or other parts thereof, as may be moſt agreeable to their exploits.

The reaſon why eagles are generally borne with their wings and tail expanded, is becauſe this poſture is beſt fitted to fill up the eſcutcheon. However, there are eagles borne in other poſtures, though not ſo common; all which will be explained under their reſpective articles.

The arms of the emperor of Germany are,

are, Or, a ſpread eagle with two heads, ſable; diademed, langued, beaked, and membered, gules. Some authors expreſs the two heads by the term diſplayed. The kingdom of Poland bears, Gules, an eagle, argent; crowned and membered, or.

Among the antients, the eagle was held ſacred to Jupiter, and on that account placed on his ſcepter. Philoſtratus, in his Themiſtocles, ſays, the Medes and Lacedæmonians took it for their enſign of royalty: and it is well known that the Romans had the greateſt reſpect for it, looking upon it as the taliſman of their ſtate, and taking it for their principal enſign. It was either of gold or ſilver, borne ſingle on the point of a pike, till the time of Conſtantine, when the empire being divided into the eaſtern and weſtern, the eagle was afterwards repreſented with two heads.

EAGLE, *aquila*, in aſtronomy. See the article AQUILA.

EAGLE, in architecture, a figure of that bird antiently uſed as an attribute of Jupiter, in the capitals and friezes of the columns of the temples conſecrated to that god.

EAGLE-OWL, the ſame with the bubo, or great-horned owl. See BUBO.

EAGLE-STONE, ÆTITÆ, in natural hiſtory. See the article ÆTITÆ.

Black EAGLE, an order of knighthood, inſtituted by the elector of Brandenburgh, in 1701, on his being crowned king of Pruſſia.

The knights of this order wear an orange-coloured ribband, ſuſpending a black eagle.

White EAGLE, a like order in Poland, inſtituted in 1325, by Uladiſlaus V. On occaſion of the marriage of his ſon Caſimir to the daughter of the great duke of Lithuania.

The knights of this order wear a chain of gold, ſuſpending a ſilver eagle, crowned.

EAGLET, a diminutive of eagle, properly ſignifying a young eagle. In heraldry, when there are ſeveral eagles on the ſame eſcutcheon, they are termed eaglets.

EAR, *auris*, in anatomy, the organ of hearing. See the article HEARING.

Anatomiſts divide the ear into three parts, the exterior, the middle, and the interior. The exterior part is called ſimply the auricle, but more properly auris externa. In this there are a great many eminences and cavities; as, the pinna and lobucle; the helix and anthelix; and the tragus and antitragus; the ſcapha, which is a cavity between the helix and the anthelix behind; and the concha, which is a larger cavity, ſituated before the meatus auditorius, or paſſage into the internal ear: here are to be obſerved the glandulæ ſebaceæ of Valſalva, which are mere cutaneous follicles: their ſubſtance is compoſed of the common integuments and a cartilage.

The muſcles of the external ear are in human ſubjects very ſmall, often ſcarce diſcernible; however, ſometimes two, three, or more of them may be diſtinguiſhed. Theſe, from their ſituation, may be called the ſuperior, the poſterior, and the anterior. Their uſe in moving the ear is none at all, or very inconſiderable; their real uſe, as is ſuppoſed, is to render the ear tenſe, when we would hear more diſtinctly. The courſe of the meatus auditorius is tortuous and oblique, turning chiefly towards the anterior parts. Its ſubſtance is partly boney, and partly cartilaginous: is is covered with an elaſtic membrane: the membrane inveſting its internal part is continuous with the cutis. In the convex part of this membrane, about the middle of the paſſage, are ſituated certain ſmall glands, of a yellow colour, called glandulæ ceruminoſæ: they ſerve to ſecrete the cerumen, which they depoſit for various purpoſes in the paſſage.

The uſe of the external ear is to receive and convey ſounds in the manner of an acouſtic tube, in order to our hearing them more diſtinctly.

The middle part of the ear is called the tympanum: in this we are to obſerve the membrana tympani, which is ſituated at the extremity of the auditory paſſage. Its ſituation is very oblique inwards; its figure elliptic, and its ſurface concave. It is connected in its circumference with a ring of a boney ſubſtance in infants, which becomes afterwards transformed into the auditory paſſage, and in the middle it is connected with the little bone, called the malleus. Its ſubſtance is membranaceous, compoſed of two or three lamellæ, and is furniſhed with a vaſt number of blood-veſſels.

Some authors mention a natural foramen, very ſmall, and placed in an oblique direction, penetrating this membrane, and letting the ſmoke of tobacco, taken in at the mouth, find a paſſage through

through it out at the ears. The boney cavity of the tympanum is much ſmaller in human ſubjects than in quadrupeds. In this cavity are to be obſerved the perioſteum, which is very thin, and furniſhed with a great number of blood-veſſels; the chorda tympani, being a little nerve compoſed by a combination of ramuli, or little branches of the fifth and ſeventh pairs: this is extended in the manner of a cord, under the membrane of the tympanum. Here may be obſerved the three oſſicula auditus, covered with the perioſteum; theſe are called the malleus, the incus, and the ſtapes. The manubrium, or handle of the malleus, adheres to the membrane of the tympanum, and its head is articulated by a ginglymus with the body of the incus; and, finally, the longer leg of this is articulated, by arthrodia, with the head of the ſtapes: the ſtapes alſo, at its baſe, adheres to the feneſtra ovalis, by means of a membrane.

The muſcles of the malleus are two, an external and internal: the ſtapes has but one. The two feneſtræ, or openings, are diſtinguiſhed by the oval and the round; the feneſtra ovalis leads to the veſtibule, on which ſtands the ſtapes; the feneſtra rotunda leads to the cochlea, and is cloſed by a membrane.

Beſides the feneſtræ, there are two other foramina, the one of theſe opens into the tube or duct of Euſtachius, and terminates in the mouth, almoſt immediately behind the tonſils: this duct is partly boney, partly cartilaginous, and partly membranous, affording a communication between the mouth and the ears: the other of theſe foramina goes to the cellulæ of the maſtoide proceſſes. The third diviſion, or the inner part of the ear, is generally termed the labyrinth: here are to be obſerved the veſtibulum, being a cavity that forms the middle part of the labyrinth: the paſſage into this is the feneſtra ovalis; after which may be obſerved the three ſemicircular canals, diſtinguiſhed by the names of the largeſt, the middle one, and the leaſt, which open by five orifices into the veſtibulum. The cochlea of the ear is placed oppoſite to theſe canals, and is in the manner of a ſnail-ſhell, forming two turns and a half in a ſpiral form. In this are to be remarked the nucleus and the canal, which is divided into two, by a ſpiral lamina: the upper of theſe opens into the veſtibulum, and is called the ſcala veſtibuli, and the lower, which terminates in the hollow of the tympanum, through the feneſtra rotunda, is called ſcala tympani.

A very delicate and fine membrane carried along through the cavities of the labyrinth, is formed of an expanſion of the auditory nerve, and is the primary part of the organ of hearing, juſt as the retina is formed of the expanſion of the optic nerve, and is the primary organ of ſeeing. Next may be obſerved the auditory canal, which is diſtinguiſhed into the common and proper; the common is large, and has foraminula in it, paſſing into the labyrinth; the proper one is narrow and longer, terminating partly in the cavity of the cranium, and partly between the ſtyloide and maſtoide proceſſes.

The nerves of the inner ear are, 1. from the auditory pair. 2. from the third pair of the vertebrals of the neck, but theſe are principally ſent to the external ear. The arteries are from the carotids, both external and internal; the veins run partly to the juglars, and partly to the ſinuſes of the dura mater.

Wounds of the EAR. Wounds of the external ear are eaſily united by ſticking-plaiſters, unleſs the cartilage is entirely divided, and then it will require the help of the needle, and the application of vulnerary balſams, with the proper compreſſes and bandages. When the ear is wounded in the neighbourhood of the meatus auditorius, great care muſt be taken to prevent the diſcharge of blood and matter into that paſſage, which would do great miſchief to the tympanum; but this may be done only by filling the internal ear with lint or cotton.

EAR-ACH, a grievous pain in the auditory paſſage, proceeding from a ſharp extravaſated ſerum, affecting the nervous membrane which covers the meatus auditorius.

When this matter is tranſlated to the external part, then the ear-ach ariſes, which, unleſs ſpeedily appeaſed, may coſt the patient his life.

The principal ſcope is to eaſe the pain, which may be done with nitrous and cinnabarine powders, and with emulſions of the greater cold ſeeds: but if theſe are ineffectual, recourſe muſt be had to opiates, ſuch as ſtyrax pills, or the bare tincture. Outwardly lay a plaſter to the temple of the affected ſide, compoſed of maſtic, galbanum, ſaffron, expreſſed oil of nutmegs, and opium. Afterwards let

let the ear be held over the vapour of milk, with the fragrant and emollient ſpices: the ſmoke of tobacco, blown into the ear, is of great efficacy; as alſo an infuſion of millepedes in ſallad oil.

Cloſed meatus auditorius. Sometimes the meatus auditorius is from the birth cloſed with a membrane, differing in degrees of thickneſs; ſometimes immediately after the birth, and ſometimes a conſiderable while after. When this membrane cloſes the external ear, the faculty of hearing may be reſtored by making a cruciform inciſion in the occluding membrane, and keeping the paſſage open for ſome time with lint, or a tent; but when the ſaid membrane is ſeated very deep, it is beſt to divide it by a tranſverſe or longitudinal inciſion, taking care that you do not at the ſame time wound the membrane of the tympanum which in infants is not ſeated ſo deep in the ear as in adults.

Tubercles in the meatus auditorius. Tubercles or fleſhy excreſcences in the auditory paſſage of the ears give great uneaſineſs, and do partly, if not wholly, obſtruct the hearing. When they are not of long ſtanding, they may be removed with eſcharotics; or, as theſe are dangerous when they touch the membrane of the tympanum, they may be extirpated by the ſciſſars, or ſcalpel, when they are not ſeated too low in the ear. Laſtly, it appears from the obſervations of Hildanus, (cent. iii. obſ. 1.) and Purmannus, (chirurg. pag. 280.) that theſe tubercles may be frequently removed with ſucceſs by ligature.

For other diſorders of the ear, and for the method of extracting extraneous bodies fallen into it, ſee the articles Deafness, Tinnitus Aurium, &c. and the article Extraction.

Ear, in muſic, denotes a kind of internal ſenſe, by which we perceive and judge of harmony, and muſical ſounds.

Ear, among gardeners, a name given to the leaves that firſt appear from the ſeed, which differ conſiderably from other leaves. See the article Leaf.

Ear-pick, an inſtrument of ivory, ſilver, or other metal, ſomewhat in form of a probe, for cleaning the ear.

The Chineſe have a variety of theſe inſtruments, with which they are mighty fond of tickling their ears; but this practice, as Sir Hans Sloane judiciouſly obſerves, muſt be very prejudicial to ſo delicate an organ, by bringing too great a flow of humours on it.

Ear-shells, *aures marinæ*. See the article Aures Marinæ.

Small pearls are ſometimes found in theſe ſhells, whereof there are ſeveral ſpecies. See the article Pearl.

Ear-wax, *cerumen*. See the article Cerumen.

Ear-wig *forficula*, in zoology. See the article Forficula.

EARING, in the ſea-language, is that part of the bolt rope which at the four corners of the ſail is left open, in the ſhape of a ring. The two uppermoſt parts are put over the ends of the yard arms, and ſo the ſail is made faſt to the yard; and into the lowermoſt earings, the ſheets and tacks are ſeized or bent at the clew.

EARL, a britiſh title of nobility, next below a marquis, and above a viſcount. Earls were antiently called comites, becauſe they were wont *comitari regem*, to wait upon the king for council and advice. The Germans call them *graves*, as landgrave, margrave, palſgrave, rheingrave; the Saxons ealdormen, unleſs that title might be more properly applied to our dukes; the Danes, eorlas; and the Engliſh, earls. The title, originally, died with the man. William the conqueror firſt made it hereditary, giving it in fee to his nobles, and alloting them for the ſupport of their ſtate the third penny out of the ſheriff's court, iſſuing out of all pleas of the ſhire whence they had their title. But now the matter is quite otherwiſe; for whereas heretofore *comes* and *comitatus* were correlatives, and there was no comes or earl, but had a county or ſhire for his earldom, of latter years the number of earls increaſing, and no more counties being left, divers have made choice of ſome eminent part of a county, as Lindſey, Holland, Cleveland, &c. ſome of a leſſer part, as Strafford, &c. others have choſen for their title ſome eminent town, as Marlborough, Exeter, Briſtol, &c. and ſome have taken for their title the name of a ſmall village: their own ſeat or park, as Godolphin, Clarendon, &c. An earl is created by cincture of ſword, mantle of ſtate put upon him by the king himſelf, a cap and a coronet put upon his head, and a charter in his hand. All the earls of England are denominated from ſome ſhire, town or place, except three; two of whom, *viz.* earl Rivers, and earl Paulet, take their denomination from illuſtrious families: the third is not only honorary, as all the reſt, but alſo officiary,

ciary, as the earl marſhal of England.

EARL *marſhal of England*, is a great officer who had antiently ſeveral courts under his juriſdiction, as the court of chivalry, and the court of honour. Under him is alſo the herald's office or college of arms. He hath ſome pre-eminence in the court of Marſhalſea, where he may ſit in judgment againſt thoſe who offend within the verge of the king's court. This office is of great antiquity in England, and antiently of greater power than now; and has been for ſeveral ages hereditary in the moſt noble family of Howard.

EARNEST, *arrhæ*, money advanced to bind the parties to the performance of a verbal bargain. By the civil law, he who recedes from his bargain loſes his earneſt, and if the perſon who received the earneſt give back, he is to return the earneſt double. But with us, the perſon who gave it, is in ſtrictneſs obliged to abide by his bargain; and in caſe he decline it, is not diſcharged upon forfeiting his earneſt, but may be ſued for the whole money ſtipulated.

EARTH, *terra*, in phyſiology, one of the four vulgar, or peripatetical elements: defined a ſimple, dry, and cold ſubſtance; and as ſuch, an ingredient in the compoſition of all natural bodies.

It ſhould be well obſerved, that the element earth is a very different matter from the earth whereon we tread. Ariſtotle having laid down cold and dry as his firſt element, to give it a ſuitable name, looked among the diverſe bodies for that which ſhould come the neareſt thereto; which being earth, he gave his firſt element that denomination: though thus borrowing a word that had had been uſed for a different thing, occaſioned a great part of his followers to run into an extravagant error, and to ſuppoſe that this habitable foſſile earth was an element.

EARTH, in natural hiſtory, a foſſile, or terreſtrial matter, whereof our globe partly conſiſts.

Earths are either ſimple or compound. The ſimple earths are friable, opake, inſipid bodies, not inflammable, vitrifiable by extreme heat, diffuſible in water, and ſeparable from it by filtration. Of theſe we have five genera or kinds, *viz.* boles, clays, marles, ochres, and tripelas. See BOLE, CLAY, MARLE, *&c.*

The compound earths are compoſed of argillaceous or marley particles ſeparated and divided by adventitious matter, and never free from theſe mixtures, or in the ſtate of pure earths. Of theſe we have four genera, two of loams, *viz.* thrauſtomicthes, and gliſchromicthes; and two of moulds, *viz.* thruptomicthes, and gloromicthes. See LOAMS, MOULD, THRAUSTOMICTHES, THRUPTOMICTHES, *&c.*

Beſides theſe earths, there are frequently found in digging a kind of terræ miſcellanæ, of no determinate ſpecies, nor to be known by any peculiar name, being compoſed of maſſes of different ſizes, of different ſpecies of earths, broken off from their ſtrata, ſoon after their formation, and blended together at the time of the original ſubſidence of the ſtrata. As for chian, eretrian, lemnian, and malteſe earths, together with all the ſealed earths which are the ſubjects of the materia medica, ſee the articles CHIAN EARTH, ERETRIAN EARTH, BOLE, MARLE, *&c.*

EARTH, in gardening and huſbandry, if good, ſhould be of a blackiſh colour, gravelly, fat, pliant, or eaſy to be digged; it ſhould be neither cold nor light, it ought to have no ill ſmell or taſte, and it ſhould be of the ſame quality three or four feet deep for trees, which if they have not that depth, will languiſh and decay after they have been planted ſix years. Fruit trees will thrive in a leſs depth, and they generally produce the moſt generous fruits, when their roots ſpread near the ſurface of the earth.

Huſbandmen call that new earth which lying three or more feet deep, never ſerved to the nouriſhment of any plant; or earth that has been a long time built upon, though it had formerly bore; earth likewiſe of a ſandy loamy nature, where cattle have been a long time fed, may be accounted ſuch, and be of excellent uſe for moſt ſorts of plants, eſpecially if it has been thrown up in heaps to grow richer.

EARTH, in chemiſtry, is uſed for a principle or element, in the compoſition of bodies, entering them either as an ingredient, or giving them a power of performing various operations in nature and art. It is a body, as having three dimenſions, impenetrability, figurability, and its own particular gravity. In weight it exceeds water, ſalts, and the ſpirits of animals and vegetables. When pure, or perfectly ſeparated from other bodies, it is conſiſtent, hard, and fine, though brittle with regard to our ſenſes, and eaſily reducible by trituration into a certain powder, in in which reſpect it differs from the true

metals and gems; though ftill more in this, that it remains fixed and unchanged in the moft violent fire, even fo far as not to flow therein.

Boerhaave fays, he never could obtain elementary earth from metals, but it may be obtained from water, from calcined vegetables, from fmoak and foot, from putrified animals, from diftilled animal fluids, from foffile falts, and from fluid and folid fulphurs. Whence he concludes, that the fame fimple elementary earth contributes as a conftituent principle to form the particular corporeal fabric of animals, vegetables, and fome foffils of a lefs permanent and lefs fimple nature, and in them all ferves as a firm bafis to their form, whilft it unites the other principles to itfelf, and to one another, fo as to conftitute one determinate individual. Hence alfo, fays he, the property of affimulating other fubftances into the nature of every body that receives nutriment, and confequently the feminal property of producing their like, is principally owing to the efficacy of this earth; for their properties no longer remain after the particular texture depending principally upon the earth is deftroyed, or wanting in any body.

Earth, in aftronomy and geography, one of the primary planets, being this terraqueous globe whereon we inhabit.

Figure of the Earth was accounted by fome of the antients to be like that of an oblong cylinder; by others, of the form of a drum, and by others to be flat. The moderns demonftrate it to be nearly fpherical from the following, among other confiderations. 1. All the appearances of the heavens, both at land and at fea, are the fame as they would be if the earth were a globe. 2. In eclipfes of the moon which are caufed by the fhadow of the earth falling upon the moon, this fhadow is always circular, and a body can be no other than a globe, which in all fituations cafts a circular fhadow. 3. Several navigators have failed quite round the globe, fteering their courfe directly fouth and weft till they came to the magellanic fea, and from thence to the north and weft, till they returned to their port from the eaft; and all the phænomena which fhould naturally arife from the earth's rotundity, happened to them. Befides, their method of failing was alfo founded upon this hypothefis, which could never have fucceeded fo happily, if the earth had been of any other figure. It is true, the furface of the earth is not an exact geometrical globe, but then the inequalities are fo inconfiderable, that the higheft mountain bears no greater proportion to the bulk of the earth, than a grain of duft does to a common globe. The figure of the earth then was reckoned by mathematicians and geographers as perfectly fpherical, excepting the fmall inequalities in its furface, of mountains and vallies, till an accident engaged the attention of Sir Ifaac Newton, and Mr. Huygens, who demonftrated from the laws of hydroftatics, and the revolution of the earth about its axis, that its figure was not a true fphere, but an oblate fpheroid flatted towards the poles. Monfieur Richer, when at the ifland of Cayenne, about five degrees diftant from the equator, found that his clock, which at Paris kept true time, now loft two minutes and twenty-eight feconds every day. Now, though heat will lengthen pendulums, and confequently retard their motion, it is certain the heats of Cayenne were not fufficient to folve this phænomenon, which can flow only from a diminution in the preffure of gravity. For, as the earth revolves about its axis, all its parts will endeavour to recede from the axis of motion, and thereby the equatoreal parts, where the motion is quickeft, will tend lefs towards the center than the reft; their endeavour to fly off from the axis about which they revolve, taking off part of their tendency that way; fo that thofe parts will become lighter than fuch as are nearer the poles. The polar parts, therefore, will prefs in towards the center, and raife the equatoreal parts, till the quantity of matter in the latter is fo far increafed as to compenfate for its lightnefs, and an equilibrium be reftored. On which account, the form which the earth affumes will be that of an oblate fpheroid, whofe fhorter axis paffes thro' the poles. By virtue only of the rotation of the earth about its axis, the weight of bodies at the equator is lefs than at the poles, in the proportion of 288 to 289. From hence arifes, as before obferved, a fpheroidical form of the earth, and from that fpheroidical form arifes another diminution of gravity at the equator, by which, if the earth were homogeneous throughout, bodies at the equator would lofe one pound in 1121, and fo on both accounts taken together, the gravity of bodies at the poles would be

be to the fame at the equator as 230 to 229. From whence, if we fuppofe the gravity of bodies within the earth to be directly as their diftance from the center, thofe numbers will alfo exprefs the relation between its polar and equatoreal diameter. This is upon a fuppofition that the earth was at firft fluid, or a chaos, having its folid and fluid parts confufedly mixed together; but if we fuppofe it at firft partly fluid and partly dry, as it now is, fince we find that the land is very nearly of the fame figure with the fea, except raifed a little to prevent its being overflowed, the earth muft ftill be of the fame form; for otherwife the major part of the water would flow towards the equator, and fpread itfelf like an inundation over all the land in thofe parts. This theory met with great oppofition from Monfieur Caffini, who having meafured the meridian of France, declared (with great reafon likewife if the obfervations had been correct) that the earth, inftead of being flattened, was lengthened towards the poles, that is, inftead of being an oblate, it was an oblong fpheroid, higher at the poles by about ninety five miles. So wide a difference, between philofophers of fo high rank, determined at length the king of France, at an expence becoming a monarch, to employ two companies of mathematicians, the one to meafure the length of a degree of the meridian at the equator, and the other the length of a degree at the polar circle, that by comparing them together, and with the length of the degree of France, it might be known whether the earth were oblong or flat towards the poles.

It is certain, if the lengths of the degrees of latitude decreafe, as we go from the equator towards the poles, then the axis is greater, and the figure an oblong fpheroid; but on the contrary, if thefe lengths increafe, as you remove towards the poles, the axis is lefs than a diameter at the equator, and confequently the figure an oblate fpheroid. This laft appears, by the refpective menfurations of thefe mathematicians (as it did before by the theory of Sir Ifaac Newton) to be the true figure; the refult of their operations, which were performed with a furprizing degree of exactnefs, being as follows. The meafure of a degree of the meridian in the latitude of 66° 20′, was found to be $57437\frac{9}{10}$ toifes, and in the latitude of 49° 21′ only 57183 toifes; for the obfervations of Mr. Caffini have been corrected by fome gentlemen of the french academy, fince the return of the academicians from the north. Now fuppofing thofe degrees accurately meafured, the axis or diameter that paffes through the poles will be to the diameter of the equator, as 177 to 178, and hence the earth will be twenty-two miles higher at the equator than at the poles. The length of a degree of the meridian under the equator, was found to be 56767 toifes, and by reducing it to the level of the fea, 56746 toifes. But as the heat muft needs have produced fome variation in the length of the toife that was ufed, when this correction is made, the length of a degree was found to be 56753 toifes, and the ratio of the axis of the earth to the diameter of the equator, that of 178 to 179; whence it follows that the earth is oblate, or flatted a 179th part towards the poles. Hence the length of the degrees of the meridian in any latitude are determined, for which we refer to the article DEGREE. If any one is defirous of being informed of the methods obferved in performing thefe menfurations at the equator, and the arctic circle, let him confult Mr. Maupertuis's figure of the earth determined, with Mr. Murdoch's tranflation, and the book lately publifhed by Mr. Bouguer and Condamine.

From the theory, already given, of the earth, it appears, that, in its fpheroidical figure, the degrees of latitude increafe from the equator to the pole; fo that if, in the equator, a degree confifts of fixty miles, in the feveral latitudes the miles will be as below:

Lat.	0.	10°.	20°.	30°.	40.	50°.
M. in a deg.	60.	59,5.	59,57.	59,67.	59,8.	59,93.
Lat.	60°.	70°.	80°.	90°.		
M. in a deg.	60,06.	60,16.	60,235.	60,26.		

Denfity of the EARTH. See *Quantity of matter in the* EARTH, infra.

Geographical divifions of the EARTH, comprehend, 1. Its natural divifions, as continent, ifland, peninfula, ocean, lake, gulph, *&c.* 2. Its political divifions, as empire, kingdom, province, city, Germany, Britain, Middlefex, London, *&c.* 3. The ecclefiaftical divifions, as archbifhopric, diocefe, parifh, *&c.* See the articles CONTINENT, ISLAND, *&c.*

Magnetifm of the EARTH. Dr. Knight thinks the earth may be confidered as a great

great loadſtone, whoſe magnetical parts are diſpoſed in a very irregular manner, and that the ſouth pole of the earth is analogous to the north pole in magnets; that is, the pole by which the magnetical ſtream enters. He obſerves, that the earth might become magnetical by the iron-ores it contains, and notwithſtanding it might have remained unmagnetical, unleſs ſome cauſe had exiſted capable of making that repellent matter producing magnetiſm move in a ſtream thro' the earth, yet he thinks that ſuch a cauſe does really exiſt. For if the earth revolves round the ſun in an ellipſis, and the ſouth pole of the earth is directed towards the ſun at the time of its deſcent, a ſtream of repellent matter will thereby be made to enter at the ſouth pole, and come out at the north. And he ſuggeſts, that the earth's being in its perihelion in the winter, may be one reaſon why magnetiſm is ſtronger in this ſeaſon than in ſummer. Hence alſo the doctor thinks it probable, that the earth's magnetiſm has been improving ſince the creation, and that this may be one reaſon why the uſe of the compaſs was not diſcovered ſooner. See the article MAGNET.

Motion of the EARTH. The earth has a triple motion. 1. A *diurnal motion* round its own axis, from weſt to eaſt, in twenty-four hours, which occaſions the perpetual ſucceſſion of days and nights. It is agreeable to reaſon that the earth ſhould revolve about its axis to account for the appearance of ſuch a vaſt number of ſtars which ſeem to perform their revolutions round the earth in twenty-four hours; for the motion of theſe ſtars, were it real, would be incredibly ſwift and beyond all imagination, becauſe their diſtance in reſpect of us, is almoſt infinite, and the orbit they have to run round ſo prodigiouſly great, that they muſt move at leaſt 100,000 miles in a minute. See the articles DIURNAL and COPERNICAN *Syſtem*.

2. *An annual motion* round the ſun in a year, which produces the different ſeaſons, and the lengthening and ſhortening of days. We have, under the article COPERNICAN *Syſtem*, demonſtrated that the earth moves round the ſun: we ſhall here explain the phænomena that ariſe from that motion, in conjunction with the rotation round its axis, having firſt premiſed that the earth in its annual motion has its axis always in the ſame direction, or parallel to itſelf. See the article PARALLELISM.

Suppoſe ♑ ♈ ♋ ♎ (plate LXXXII, fig. 1.) the earth's orbit, and S the ſun. Thro' the center of the ſun draw the right line ♈ S ♎ parallel to the common ſection of the equator and the ecliptic, which will meet with the ecliptic in two points ♈ ♎. And when the earth ſeen from the ſun is in either of the points ♈ or ♎, a right line S ♈ or S ♎, joining the center of the earth and ſun, will coincide with the common ſection of the equator and ecliptic, and will then be perpendicular to A B, the axis of the earth, or of the equator, becauſe it is in the plane of the equator. But the ſame line is alſo perpendicular to the circle which bounds the light and darkneſs, and therefore the axis of the earth will be in the plane of that circle, which will therefore paſs through the poles of the earth, and will cut the equator and all its parallels into equal parts. When the earth, therefore, is in the beginning of ♎, the ſun will be ſeen in ♈, in the common ſection of the equator and ecliptic, in which poſition, the circle of illumination touches both poles; the ſun is vertical to the equator, and the days and nights are equal all the world over: and this will be the ſpring ſeaſon, or vernal equinox. See the article EQUINOX.

The earth in its annual motion going through ♎, ♏, and ♐ towards ♑, and the common ſection of the equator and the ecliptic remaining always parallel to itſelf, it will no longer paſs through the body of the ſun; but, in ♑, it makes a right angle with the line S P, which joins the centers of the ſun and earth. And becauſe the line S P is not in the plane of the equator, but in that of the ecliptic, the angle B P S, which the axis of the earth B A makes with it, will not now be a right angle, but an oblique one of 66 ½ degrees, which is the ſame with the inclination of the axis to the plane of the ecliptic. Let the angle S P L be a right angle, and the circle bounding light and darkneſs, will paſs through the point L, and then the arch BL, or the angle BPL, will be 23 ½ degrees, that is, equal to the compliment of the angle B P S to a right angle. Let the angle B P Æ be a right angle, and then the line P Æ will be in the plane of the equator. Therefore, becauſe the arches B Æ and L T are equal, each of them being quadrants; if



T. Jefferys sculp

if the common arch B T be taken away, there will remain T Æ equal to L B, equal to 23 ½ degrees. Take Æ M equal to Æ T, and through the points M and T describe two parallel circles T C, M N; the one represents the tropic of cancer, and the other the tropic of capricorn. And the earth being in this situation, the sun will approach the nearest that it can come to the north pole: he will shine perpendicularly on the point T, and consequently will be vertical to all the inhabitants under the tropic of cancer, when he comes to their meridians. It is manifest that the circle which bounds light and darkness, reaches beyond the north pole B to L; but towards the south it falls short to the south pole A, and reaches no farther than F. Through L and F, let two parallels to the equator be described. These will represent the polar circles, and while the earth is in P, all that tract of it which is included within the polar circle K L continues in the light, notwithstanding the constant revolution round the axis. On the contrary, those that lye within the antarctic circle remain in continual darkness. Besides, it is also manifest, that all the parallels between the equator and the arctic circle, are cut by the circle bounding light and darkness into unequal portions, the largest portions of these circles remaining in the light, and the smallest in darkness; but these parallels which are towards the antarctic circle have their greatest portions in darkness, and their least in light; and the difference of these portions will be greater or less, according as the circles are nearer to the pole, or to the equator. Therefore, when the sun is seen in cancer ♋, the inhabitants of the northern hemisphere will have their days at the longest, and their nights at the shortest, and the season of the year will be summer. The contrary of this will happen to the inhabitants of the southern hemisphere.

As the earth moves on from ♑ by ♒, ♓, the north pole returns, the diurnal arches begin gradually to decrease, and the nocturnal to increase, and of consequence, the sun's rays will fall more and more obliquely, and his heat proportionably diminishes, till the earth comes to ♈, when the sun will appear in ♎, at which time, the days will again be equal to the nights to all the inhabitants of the earth, the circle bounding light and darkness passing, in this position, through the poles. This will be the season called autumn.

The earth moving on through ♈ ♉ and ♊, the sun will be seen to go in the ecliptic through ♎ ♏ and ♐, and will appear to decline from the equator, towards the south, so that when the earth is really in ♋, the sun will appear in ♑. And whereas the axis A B always retains its parallelism, the earth will have the same position and aspect in respect to the sun, that it had when it was in ♑; but with this difference, that when the tract within the polar circle K L was in continual light while the earth was in ♑; now the earth arriving at ♋, that same tract will be altogether in darkness: but the opposite space within the circle F G, will be in a continual illumination, and at the pole A there will be no night for the space of six months. Here likewise of the parallels between the equator and the north pole, the illuminated portions are much less than the portions which remain in darkness, the contrary of which happened in the former position, so likewise the sun at mid-day will appear vertical to all the inhabitants that live in the tropic M N; so that it will appear to have descended towards the south from the parallel T C, to the parallel M N, through the arch C Q N, which is forty-seven degrees. This will be the season called winter.

Lastly, as the earth journeys on from cancer through ♌ and ♍ to ♎, the sun appears to pass through ♒ and ♓ to ♈, and the northern climes begin to return, and receive more directly the enlivening beams of the sun, whose meridian height does now each day increase; the days now lengthen, and the tedious nights contract their respective arches; and every thing conspires to advance the delighful season of the spring, with the equality of days and nights, as was shewn when the earth was in libra, from which point we began to trace its motion.

By the third motion of the earth, we mean that motion by which the poles of the world revolve about the poles of the ecliptic, and occasion what is commonly called the precession of the equinoxes, or more properly, the retrogression of the earth's nodes. See the article PRECESSION.

As

As to the velocity of the earth's motion, and the figure and time in which it performs a revolution round the ſun, ſee the articles PERIOD and ORBIT.

Quantity of matter in the EARTH. This arduous problem can only be ſolved by the principles of gravitation. We know the force of gravity towards our earth by the deſcent of heavy bodies, or by calculating how much the moon falls below the tangent of her orbit: alſo by computing, from their motions, how much a primary planet falls below its tangent in a given time, and how much any of Jupiter's and Saturn's ſatellites fall below their tangents in the ſame time, we are able to determine the proportion which the gravity of a primary planet to the ſun, and of a ſatellite towards its primary, bears to the gravity of the moon towards the earth, in their reſpective diſtances. Then, from the general law of the variation of gravity, the forces that would act upon them at equal diſtances from the ſun, Jupiter, Saturn, and the earth are computed; which give the proportion of the quantities of matter contained in theſe different bodies; that is, if we ſuppoſe the matter of the ſun to be 1, the quantities of matter in Jupiter, Saturn, and the earth will be reſpectively $\frac{1}{1067}$, $\frac{1}{3021}$, $\frac{1}{169282}$.

The quantities of matter in theſe bodies being thus determined, and their bulk being known from aſtronomical obſervations, it is eaſy to compute their different denſities. Thus, the denſities of the ſun, Jupiter, Saturn, and the earth have been computed to be reſpectively as the numbers 100, 94$\frac{1}{2}$, 67, and 400.

Theory of the EARTH. The earth in its natural and original ſtate Des Cartes, Burnet, Woodward, and Whiſton, ſuppoſe to have been perfectly round, ſmooth, and equable; and they account for its preſent rude and irregular form principally from the great deluge. See the article DELUGE.

Mr. de Buffon, arguing from the ſpheroidical figure of the earth, and the laws of hydroſtatics, ſuppoſes that the earth, as well as the other planets, are parts ſtruck off from the body of the ſun by the colliſion of comets, and conſequently, when the earth aſſumed its form, it was in a ſtate of liquefaction by fire. Of this, ſays he, we will be the more eaſily convinced, when we conſider the nature of the matter contained in the body of the earth, the greateſt part of which, as ſand and clays, are vitrified, or vitrifiable ſubſtances; and, on the other hand, when we reflect upon the impoſſibility of the earth's being ever in a ſtate of fluidity produced by water, ſince there is infinitely more land than water; and beſides, water has not the power of diſſolving ſand, ſtones, and other ſubſtances of which the earth is compoſed. How far the inequalities in the face of the earth, the beds of rivers, lakes, &c. and the various ſtrata in its internal parts, ſerve to confirm this hypotheſis, may be ſeen in Hiſtoire Naturelle, &c. tom. 1. by M. de Buffon, and in the articles MOUNTAIN, RIVER, STRATA, &c.

Diameter of the EARTH. See DIAMETER.

Diſtance of the EARTH *from the Sun.* See the article DISTANCE.

Latitude of the EARTH. See LATITUDE.

Longitude of the EARTH. See LONGITUDE.

EARTH-BAGS, *facs a terre*, in fortification. See the article SAND-BAGS.

EARTHING, in agriculture and gardening, ſignifies the covering of ſhrubs and plants, as vines, celery, &c. with earth.

EARTHQUAKE, in natural-hiſtory, a violent agitation or trembling of ſome conſiderable part of the earth, generally attended with a terrible noiſe like thunder, and ſometimes with an eruption of fire, water, wind, &c.

Cauſes of EARTHQUAKES. Earthquakes and vulcanos are both produced from the ſame cauſe, which may be thus explained. Thoſe countries which yield great ſtore of ſulphur and nitre, or where ſulphur is ſublimed from the pyrites, are by far the moſt injured and incommoded by earthquakes; for where there are ſuch mines, they muſt ſend up exhalations, which meeting with ſubterraneous caverns, muſt ſtick to the arches of them, as ſoot does to the ſides of our chimnies; where they mix themſelves with the nitre or ſaltpetre which comes out of theſe arches, in like manner as we ſee it come out of the inſide of the arch of a bridge and ſo makes a kind of cruſt which will very eaſily take fire.

There are ſeveral ways by which this cruſt may take fire, *viz.* 1. By the inflammable breath of the pyrites, which is a kind of ſulphur that naturally takes fire of itſelf. 2. By a fermentation of vapours to a degree of heat, equal to that of fire and flame. 3. By the falling of

ſome

fome great ftone which is undermined by water, and ftriking againft another, produces fome fparks that fet fire to the neighbouring combuftible matter, which being a kind of natural gunpowder, at the appulfe of the fire goes off with a fudden blaft or violent explofion, rumbling in the bowels of the earth, and lifting up the ground above it, fo as fometimes to make miferable havock and devaftation, till it gets vent or a difcharge. Burning mountains and vulcanos are only fo many fpiracles ferving for the difcharge of this fubterranean fire, when it is thus preternaturally affembled. And where there happens to be fuch a ftructure and conformation of the interior parts of the earth, that the fire may pafs freely and without impediment from the caverns therein, it affembles into thefe fpiracles, and then readily and eafily gets out from time to time without fhaking or difturbing the earth. See the article VULCANO. But where a communication is wanting, or the paffages are not fufficiently large and open, fo that it cannot come at the faid fpiracles, without firft forcing and removing all obftacles, it heaves up and fhocks the earth, till it hath made its way to the mouth of the vulcano; where it rufheth forth, fometimes in mighty flames, with great velocity, and a terrible bellowing noife.

Earthquakes are fometimes confined to a narrow fpace, which is properly the effect of the re-action of the fire; and they fhake the earth juft as the explofion of a powder-magazine caufes a fenfible concuffion at the diftance of feveral leagues. Thus a violent eruption of Ætna, will caufe an earthquake over all the ifland of Sicily; but it will never extend to the diftance of three or four hundred leagues. In like manner, when fome new vents of fire have been formed in mount Vefuvius, there are felt at the fame time earthquakes at Naples, and in the neighbourhood of the vulcano; but thefe concuffions have never fhaken the Alps, nor been communicated to France, or other countries remote from Vefuvius.

Sometimes they are felt at confiderable diftances, and fhake a long tract of ground without any eruption or vulcano appearing. We have inftances of earthquakes which were felt at the fame time in England, France, Germany, and Hungary, and thefe extend always a great deal more in length than in breadth; the earthquake, on the 1ft of Nov. 1755, which deftroyed Lifbon, extended from north to fouth 2500 miles with the utmoft violence: it appears to have begun in Greenland, and paffing fouthward was perceived in the iflands of Trinity, Ferro, &c. fome of the weftern ifles of Scotland, in Ireland, in the fouth-weft part of England, &c. and paffing under the ocean fhook all Portugal and great part of Spain, whence it paffed to the continent of Africa with incredible violence, and having fhook the kingdoms of Fez and Morocco, probably vented itfelf in the fouthern ocean. Earthquakes fhake a tract of ground with more or lefs violence in different places, in proportion as it is remote from the fire; and they are almoft always accompanied with a dull noife like that of a heavy carriage rolling along with great rapidity. See Phil. Tr. n° 157. Woodward's Effay, and M. de Buffon's Hift. Nat. &c.

Dreadful effects of EARTHQUAKES. Catanea, a city of Sicily, which was almoft totally deftroyed in the year 1693, is a melancholy inftance of the dreadful effects of earthquakes. The fhock was not only felt all over Sicily, but likewife in Naples and Malta; and it was fo violent, that people could not ftand upon their legs; and thofe who lay on the ground, were toffed from fide to fide, as if on a rolling billow. The earth opened in feveral places, throwing up large quantities of water; and great numbers perifhed in their houfes by the fall of rocks that were rent from the mountains. The fea was violently agitated, and roared dreadfully: mount Ætna threw up vaft fpires of flame, and the fhock was attended with a noife exceeding the loudeft claps of thunder. Fifty-four cities and towns, with an incredible number of villages, were either deftroyed or greatly damaged; and it was computed that near 60,000 perfons perifhed in different parts of the ifland, of whom 18,000 were inhabitants of Catanea. In 1746, the city of Lima, and port of Callao in Peru, fuffered prodigioufly from an earthquake. All the buildings of Callao, except one tower, were funk in the fea, and confequently all the inhabitants drowned: of five and twenty fhips that were in the port, four were carried a league up the country, and the reft fwallowed up by the waves. At Lima, which is a pretty large city, only feven and twenty houfes remained ftanding: a great number of people were crufhed to death, efpecially monks and nuns, be-

caufe their monafteries were higher, and built of more folid materials than the other houfes. The fhock lafted fifteen minutes. The earthquake which proved fo fatal to Portugal in 1755, did no damage to Great Britain or Ireland, though it was felt in both countries, probably from its lying very deep under the furface of the earth. The inhabitants of the city of Oporto were alarmed with a rumbling noife before the fhock, by which the whole city was fhaken, feveral chimnies, ftones, and croffes were thrown down, and fome churches opened at top; the river retiring about twenty yards returned with great violence, and a horrid noife; and two large fhips lying without the bar, the fea rofe in one great wave and brought them clear over the bar, and places that were before dry, into the river. The fame fhock was equally violent at Madrid, Seville, and Cadiz, and at this laft-mentioned place the fea rofe in a wave between fixty and feventy feet high, and with the utmoft violence dafhed againft the rocks on the weft part of the town, and againft the walls with fuch fury as to beat in the breaft-work, and about eighty yards of the wall in length, broke into the town and overflowed the ftreets, by which a great many perifhed. At Lifbon the firft fhock lafted near eight minutes with the utmoft violence, in which time almoft all the public edifices and moft of the other houfes of that fuperb capital were thrown down, and upwards of fifty thoufand people buried in the ruins. During this fhock, which was attended with fuch a horrid noife, that moft people apprehended the diffolution of the world, the earth trembled to that degree that people could fcarce keep upon their legs. This fhock in about fifteen minutes was followed by another no lefs violent, during which the earth opened in feveral places, and having fwallowed whole ftreets, threw up dreadful quantities of fire, water, and fmoke. At the fame time the water in the river rofe up feveral yards perpendicularly. Several veffels were fwallowed in the Tagus by the agitation of the waters, or funk by the fall of the buildings fituated on the banks of that river.

There is no place of note in the kingdoms of Portugal and Algarva but fhared more or lefs in this calamity. Some of the principal mountains have been fplit, and large maffes of them rolled down into the adjacent vallies. At Faro upwards of 3000 of the inhabitants were buried in the ruins of their houfes, and great part of the cities of Malaga, Port St. Mary, St. Lucar, *&c.* were deftroyed. From the fouth-coafts of Spain and Portugal, the earthquake paffed under the fea over to Africa, and deftroyed great part of the city and port of Algiers, and other cities upon the coaft of Barbary; and fince then other parts of Africa, and great part of Syria have been laid wafte by earthquakes. See an account of a terrible earthquake that happened at Jamaica in 1692, in Phil. Tr. n° 209, and an account of other earthquakes in n° 462, 463. See alfo Buffon's Hift. Nat. tom. 1.

Suppofed effects of EARTHQUAKES. In 1758, Mr. Lomonofow prefented a paper to the Royal Academy of Sciences at Peterfburg, endeavouring to fhew, that the formation of metals is a neceffary confequence of earthquakes. The interior parts of the globe, fays he, abound with fulphureous matter, which occafions that extraordinary heat, and thofe fires, of whofe exiftence the vulcanos are evident proofs. Thefe internal fires, when pent up and finding no vent, are frequently fo violent as by increafing the elafticity of the confined air, to give rife to earthquakes; by the agitation of which are occafioned a multitude of cavities near the earth's furface. In the formation of thefe cavities, it is pretended, there are abforbed large quantities of foffile fubftances mixed with vegetable falts, produced from the decompofition of the trees and plants, whofe diffolved falts find their way by means of the rivers to the fea. Now the fire acting in thefe cavities on the foffile fubftances, and the vegetable falts contained therein, reduces the whole into a mineral ftate; after which, the minerals fo conftituted are in a manner diffolved by the fire, and diftributed into beds and veins, in the manner they are found to exift in the mine.

Artificial EARTHQUAKES. Chemiftry furnifhes us a method of making artificial earthquakes, which fhall have all the great effects of natural ones: this method, as it may illuftrate the procefs of nature in the production of thefe terrible phænomena, we fhall here add.

To twenty pounds of iron filings, add as many of fulphur: mix, work and temper the whole together with a little water, fo as to form a mafs of the confiftence of a firm pafte. This, being buried three or four feet under ground, in fix or feven hours

hours time, will have a prodigious effect: the earth will begin to tremble, crack and smoke, and fire and flame will burst through.

Such is the effect even of two cold bodies, in the cold ground, and there only wants a sufficient quantity of this mixture to produce a true Ætna. If it were supposed to burst out under the sea, it would produce a water-spout; and if it were in the clouds, the effect would be thunder and lightening.

EASE, among sailors. See EASING.

EASEL-PIECES, a denomination given by painters to such pieces as are contained in frames, in contradistinction from those painted on ceilings, *&c.*

EASEMENT, in law, a privilege or convenience which one neighbour has of another, whether by charter or prescription, without profit: such are a way through his lands, a sink, or the like. These, in many cases, may be claimed.

EASING, in the sea-language, signifies the slackening a rope, or the like: thus, to ease the bow-line or sheet, is to let them go slacker; to ease the helm, is to let the ship go more large, more before the wind, or more larboard.

EASLOW, a borough of Cornwall, twenty-two miles south of Launceston, which sends two members to parliament.

EAST, one of the four cardinal points of the world; being that point of the horizon, where the sun is seen to rise when in the equinoctial. See COMPASS, HORIZON, EQUINOCTIAL, *&c.*

EAST is also frequently compounded with other words, as east-indies, east-dial, east-wind, *&c.* to signify their being situated towards the east. See the articles INDIES, DIAL, WIND, *&c.*

EASTER, a festival of the christian church, observed in memory of our Saviour's resurrection.

The Greeks call it πασχα, the Latins, *pascha*; an hebrew word signifying *passage*, applied to the jewish feast of the passover, to which the christian festival of easter corresponds. It is called easter in the English, from the goddess Eostre, worshipped by the Saxons with peculiar ceremonies in the month of April. See the article PASSOVER.

The observation of this festival, is as antient as the very time of the apostles. In the primitive ages of the church, there were very great disputes about the particular time when this festival was to be kept. The asiatic churches kept their easter upon the very same day the Jews observed their passover; and others, on the first Sunday after the first full moon in the new year. This controversy was determined in the council of Nice, when it was ordained that Easter should be kept upon one and the same day, which should always be a Sunday, in all christian churches throughout the world.

But though the christian churches differed as to the time of celebrating easter, yet they all agreed in shewing particular respect and honour to this festival: hence, in antient writers, it is distinguished by the name of *dominica gaudii*, i. e. Sunday of joy. On this day prisoners and slaves were set free, and the poor liberally provided for. The eve, or vigil, of this festival was celebrated with more than ordinary pomp, which continued till midnight, it being a tradition of the church that our Saviour rose a little after midnight; but in the east, the vigil lasted till cock-crowing.

It was in conformity to the custom of the Jews, in celebrating their passover on the fourteenth day of the first month, that the primitive fathers ordered, that the fourteenth day of the moon, from the calendar new moon, which immediately follows the twenty-first of March, at which time the vernal equinox happened upon that day, should be deemed the paschal full moon, and that the Sunday after should be easter-day; and it is upon this account that our rubric has appointed it upon the first Sunday after the first full moon immediately following the twenty-first day of March. Whence it appears, that the true time for celebrating easter, according to the intention of the council of Nice, was to be the first Sunday after the first full moon following the vernal equinox, or when the sun entered into the first point of aries; and this was pope Gregory's principal view in reforming the calendar, to have easter celebrated according to the intent of the council of Nice.

Having first found the epact and dominical letter, according to the method delivered under these articles, easter-day may be found by the two follwing rules.

1. To find easter-limit, or the day of the paschal full moon, counted from March 1 inclusive, the rule is this: add 6 to the epact, and if this sum exceeds 30, take 30 from it; then from 50 substract this remainder, and what is left will be the limit; if the sum of the epact, added to 6, does not amount to 30, it must be sub-

ſtracted from 50, and the remainder is the limit required; which is never to exceed 49, nor fall ſhort of 21.

4. From the limit and dominical letter, to find eaſter-day: add 4 to the dominical letter; ſubſtract this ſum from the limit, and the remainder from the next higher number which contains 7 without any remainder; laſtly, add this remainder to the limit, and their ſum will give the number of days from the firſt of March to eaſter day, both incluſive.

Thus, to find eaſter-day for the year 1754, for inſtance. Firſt find the epact 6, which added to 6 gives 12; and as this ſum does not amount to 30, it muſt be ſubſtracted from 50, and the remainder 38 is the limit. Then adding 4 to 6, the number of the dominical letter F, ſubſtract this ſum, *viz.* 10, from the limit 38, and the remainder 28 from 35, the next ſuperior number that contains 7 a certain number of times without any remainder, and there remains 7, which being added to the limit 38, gives 45 for the number of days from the firſt of March to eaſter-day, both incluſive: hence, allowing 31 for March, there remains the 14th of April for eaſter-day. Here follows the operation at length.

6 + 6 = 12
50 — 12 = 38 = paſchal limit
Dominical letter F = 6
6 + 4 = 10, and 38 — 10 = 28; then 35 — 28 = 7. And
38+7=45; from which ſubſtracting
31, the number of days in March,
14 there remains 14, the day of April anſwering to eaſter-day for the year 1754.

However, to ſave the trouble of calculation, we ſhall here give a table, by which eaſter-day may be found by inſpection till the year 1900, according to the gregorian or new ſtile.

Golden Number.	DOMINICAL LETTERS. A.	B.	C.	D.	E.	F.	G.
I.	April 16	17	18	19	20	14	18
II.	April 9	3	4	5	6	7	8
III.	March 26	27	28	29	23	24	25
IV.	April 16	17	11	12	13	14	15
V.	April 2	3	4	5	6	March 31	April 1
VI.	April 23	24	25	19	20	21	22
VII.	April 9	10	11	12	13	14	8
VIII.	April 2	3	March 28	29	30	31	April 1
IX.	April 16	17	18	19	20	21	22
X.	April 9	10	11	5	6	7	8
XI.	March 26	27	28	29	30	31	25
XII.	April 16	17	18	19	13	14	15
XIII.	April 2	3	4	5	6	7	8
XIV.	March 26	27	28	22	23	24	25
XV.	April 16	10	11	12	13	14	15
XVI.	April 2	3	4	5	March 30	31	April 1
XVII.	April 23	24	18	19	20	21	22
XVIII.	April 9	10	11	12	13	7	8
XIX.	April 2	March 27	28	29	30	31	April 1

As to the uſe of this table, eaſter-day will be found in the common angle of meeting of the given dominical letter and the golden number; the name of the month lying in a direct line with it, towards the left hand.

EATON, a town of Buckinghamſhire, ſituated on the north ſide of the Thames, oppoſite to Windſor, and famous for its collegial ſchool founded by king Henry VI. being a ſeminary for king's college Cambridge, the fellows of which are all from this ſchool.

EAVES, in architecture, the margin or edge of the roof of an houſe; being the loweſt tiles, ſlates, or the like, that hang over the walls, to throw off water to a diſtance from the wall. See the articles WALL and ROOF.

EAVES-LATH, a thick feather-edged board, generally nailed round the eaves of a houſe, for the lowermoſt tiles, ſlates, or ſhingles to reſt on.

EBDOMARIUS, in eccleſiaſtical writers, an officer formerly appointed weekly to ſuperintend the performance of divine

ſervice

service in cathedrals, and prescribe the duties of each person attending in the choir, as to reading, singing, praying, &c.

EBIONITES, in church history, heretics of the first century, so called from their leader Ebion.

They held the same errors with the Nazareens, united the ceremonies of the mosaic institution with the precepts of the gospel, observed both the jewish sabbath and christian Sunday, and in celebrating the eucharist, made use of unleavened bread. They abstained from the flesh of animals, and even from milk. In relation to Jesus Christ, some of them held that he was born, like other men, of Joseph and Mary, and acquired sanctification only by his good works. Others of them allowed, that he was born of a virgin, but denied that he was the word of God, or had any existence before his human generation. They said, he was, indeed, the only true prophet, but yet a mere man, who by his virtue had arrived at being called Christ, and the son of God. They also supposed, that Christ and the devil were two principles, which God had opposed to each other. Of the New Testament, they only received the gospel of St. Matthew, which they called the gospel according to the Hebrews. See the article NAZAREANS.

EBLIS, the name used by the mahometans for the devil. See the article DEVIL.

EBONY, the wood of a tree supposed to be of the palm kind, which is imported from different countries of the East and West-Indies. This wood is extremely solid, and capable of a fine polish; and, therefore, much used in toys and marquetry.

EBRBUHARITES, a kind of mahometan monks, so called from their founder Ebrbuhar.

They make great profession of piety, and contempt of the world; but are accounted heretics by the rest of the mahometans, because they believe themselves not obliged to go in pilgrimage to Mecca.

EBRILLADE, in the manege, a check of the bridle given to the horse by a jerk of one rein, when he refuses to turn. Some confound the ebrillade with the saccade. See the article SACCADE.

As the ebrillade is a chastisement, and not aid, the use of it is banished the academies.

EBRO, antiently IBERUS, a large river of Spain, which, taking its rise in old Castile, runs through Biscay and Arragon, passes by Saragosa, and continuing its course through Catalonia, discharges itself with great rapidity into the Mediterranean, about twenty miles below the city of Tortosa.

EBULLITION, the same with boiling. See the article BOILING.

This term is also used in a synonymous sense with effervescence. See the article EFFERVESCENCE.

ECAVESSADE, in horsemanship, denotes a jerk of the cavezon. See CAVEZON.

ECCANTHIS, the same with encanthis. See the article ENCANTHIS.

ECCENTRIC and ECCENTRICITY. See EXCENTRIC and EXCENTRICITY.

ECCHO, or ECHO. See the article ECHO.

ECCHYMOSIS, εκχυμωσις, in surgery, an extravasation of the blood from a vein betwixt the flesh and skin; an accident too common, after bleeding in the arm.

There are various degrees of an ecchymosis, so that the arm is hereby not only much swelled, and of a black and blue colour, but is even sometimes violently inflamed with a most acute pain, and followed either with a suppuration or incipient mortification in the limb. This accident frequently proceeds from the vein's being cut quite asunder by the phlebotomist, but oftener from the patient's using his arm too early after bleeding, in violent and long exercises, in which the contractions of the muscles make the veins swell, and force their blood through the orifice into the interstices betwixt the flesh and skin, either in a greater or less quantity, in proportion to the degree of violence and exercise.

In a slight ecchymosis, there is little to be feared, as the stagnant blood may be generally dispersed without any great difficulty by the application of a compress dipt in vinegar and salt, or in spirit of wine. Sometimes the blood suppurates, which may be promoted by a diachylon-plaster; and when the matter is once brought to maturity, it generally makes its own way through the integuments, without any incision; after which, being discharged, the wound may be healed by a bit of diachylon-plaster. If the stagnating blood be very large, there are no hopes left to disperse it: then the disorder is in danger of terminating either in a large abscess or a gangrene: but to prevent these consequences, the surgeon should scarify, and make little incisions upon the hard part to discharge the blood, and then apply diachylon-plaster; and if the

the vein is already poffeffed with a violent inflammation or gangrene, it fhould be well fcarified and invefted with difcutient cataplafms. At the fame time it is neceffary to bleed in fome other part, and to adminifter attenuating medicines internally till it abates, or the gangrene fpreads no farther.

ECCLESIA, in law, fignifies a church or parfonage. See the articles CHURCH and PARSONAGE.

ECCLESIASTES, a canonical book of the Old Teftament, the defign of which is to fhew the vanity of all fublunary things.

It was compofed by Solomon, who enumerates the feveral objects on which men place their happinefs, and then fhews the infufficiency of all worldly enjoyments.

The Talmudifts make king Hezekiah to be the author of it; Grotius afcribes it to Zorobabel, and others to Ifaiah; but the generality of commentators believe this book to be the produce of Solomon's repentance, after having experienced all the follies and pleafures of life.

ECCLESIASTIC, or ECCLESIASTICAL, an appellation given to whatever belongs to the church: thus we fay, ecclefiaftical polity, jurifdiction, hiftory, *&c.* See POLITY, JURISDICTION, HISTORY, *&c.*

Ecclefiaftical jurifdiction may be exercifed by doctors of the civil law, though they are laymen.

ECCLESIASTICUS, an apocryphal book, generally bound up with the fcriptures, fo called from its being read in the church, *ecclefia*, as a book of piety and inftruction, but not of infallible authority.

The author of this book was a Jew, called Jefus the fon of Sirach. The Greeks call it the wifdom of the fon of Sirach.

ECHAPE, in the manege, a horfe begot between a ftallion and a mare of different breeds and countries.

ECHAPER, in the manege, a gallicifm ufed in the academies, implying to give a horfe head, or to put on at full fpeed.

ECHAUGETTE, in the military art, denotes a guerite of wood, and of a fquare form. See the article GUERITE.

ECHENEIS, in ichthyology, a genus of malacopterygious fifhes, whereof the branchioftege membrane on each fide contains about nine officles or fmall bones: its head is flat on the upper part, and marked with a number of rough tranfverfe ftriæ, or ridges.

Of this genus, there is only one known fpecies, the remora of authors. See the article REMORA.

ECHEVIN, *fcabinus*, in the french and dutch polity, a magiftrate elected by the inhabitants of a city or town, to take care of their common concerns, and the decoration and cleanlinefs of the city.

At Paris, there is a prevot, and four echevins; in other towns, a mayor and echevins. At Amfterdam, there are nine echevins; and, at Rotterdam, feven.

In France, the echevins take cognizance of rents, taxes, and the navigation of rivers, *&c.* In Holland, they judge of civil and criminal caufes; and if the criminal confeffes himfelf guilty, they can fee their fentence executed without appeal.

Echevin of the palace, an officer of the houfhold under the firft race of the french kings.

ECHINATE, or ECHINATED, an appellation given to whatever is prickly, thereby refembling the hedge-hog.

ECHINITES, in natural hiftory, the name by which authors call the foffile centronia, frequently found in our chalk-pits. See the article CENTRONIA.

ECHINOPHORA, in botany, a genus of the pentandria-digynia clafs of plants, the corolla of which confifts of five unequal patulous petals: it has no pericarpium; the general involucrum is of a turbinated figure; and the feeds are two in number, and of an oblong form.

ECHINOPS, or ECHINOPUS, GLOVE-THISTLE, in botany, a genus of the fyngenefia-polygamia-æqualis clafs of plants, the flower of which is compound; confifting of a great number of flofcules or fmall flowers, divided into feveral acute fegments: there is no pericarpium: the feed, which is fingle, is of an ovato-oblong figure, narrower at the bafe, with an obtufe hairy apex. See plate LXXXII. fig. 2.

The roots and feeds of this plant are faid to be attenuant and diuretic.

ECHINUS, in zoology, a name frequently ufed for the erinaceus, or common hedge-hog. See the article ERINACEUS.

ECHINUS, in architecture, a member or ornament near the bottom of the ionic, corinthian, and compofite capitals.

ECHIUM, VIPER'S BUGLOSS, in botany, a genus of the pentandria-monogynia clafs of plants; the flower of which confifts of a fingle petal, the tube being very fhort, and the limb erect, growing gradually wider at the extremity, where it is divided into five unequal fegments; the two upper fegments are longer than the reft, and

and the loweſt one is ſmall, acute, and reflex; there is no pericarpium, inſtead of which the cup becomes rigid, and contains in it four roundiſh and obliquely accuminated ſeeds. See plate LXXXII. fig. 3.

A powder of the root of this plant is recommended againſt epilepſies: it is alſo a ſudorific, vulnerary, and preſcribed againſt the eryſipelas.

ECHO, a ſound reverberated or reflected to the ear from ſome ſolid body.

Whereas the undulatory motion of the air, which conſtitutes ſound, is propagated in all directions from the ſounding body, it will frequently happen that the air, in performing its vibrations, will impinge againſt various objects, which will reflect it back, and ſo cauſe new vibrations the contrary way: now if the objects are ſo ſituated as to reflect a ſufficient number of vibrations back, *viz.* ſuch as proceed different ways, to the ſame place, the ſecond will be there repeated, and is called an echo: and the greater the diſtance of the object is, the longer will be the time before the repetition is heard: and when the ſound, in its progreſs, meets with objects at different diſtances, ſufficient to produce an echo, the ſame ſound will be repeated ſeveral times ſucceſſively, according to the different diſtances of theſe objects from the ſounding body, which makes what is called a repeated echo. See the articles SOUND and REFLECTION.

In order to account for the nature of echoes, we muſt conſider that ſound is perceived as coming from that place from which, as a center, the pulſes are propagated. This is well known by experience; but to illuſtrate the matter, let A (plate LXXXII. fig. 4.) be the center from whence any ſound is directly propagated, and ſtrikes againſt any plane obſtacle B C, ſufficiently large; draw A F perpendicular to B C, and produce it to H, ſo that it may be A F = F H; the ſound reflected will be perceived, as coming from the point H. For let A E be the incident ray, impinging againſt the obſtacle B C, in the point E; from E draw the ray E D in ſuch a manner that the angle C E D may be equal to the angle F E A, or that the angle of incidence may be equal to the angle of reflection; then will E D be the reflected ray of ſound, and if produced will paſs thro' the point H; for the angle F E H = C E D = F E A. Therefore in the triangle A F E and E F H, ſince the angles of the one are reſpectively equal to the angles of the other, and the ſide E F is common to both, the ſides of one triangle will be reſpectively equal to the ſides of the other; and therefore H F = A F. Wherefore the reflex ſound will be heard by a perſon at D, as coming from the point H. As the place of the auditor, or point D, approaches towards A, the caſe will conſtantly be the ſame with reſpect to the center of ſound H; the triangles will ſtill be equal, and all their angles and ſides reſpectively; and therefore when D coincides with H, the reflex ſound or echo will be heard from the point H, which was to be demonſtrated.

The ſame ſound is alſo heard twice by an auditor at D; firſt by the direct ray A D, and ſecondly by the reflex ray A E D, provided the difference between A D and A E D be ſufficiently great, that the direct and reflex ſounds do not, in the ſame ſenſible moment of time, affect the ear: for if the reflex ſound arrives at the ear before the impreſſion of the direct ſound ceaſes, the ſound will not be double, only rendered more intenſe.

From the velocity of ſound it follows, that a perſon ſpeaking or uttering a ſentence in A aloud, in order to obſerve the echo by reflection from the obſtacle B C, ought to ſtand at leaſt 73 or 74 feet from it, that is, A F = 74: and ſince at the common rate of ſpeaking, we pronounce not above $3\frac{1}{2}$ ſyllables per ſecond; therefore, that the echo may return juſt as ſoon as the three ſyllables are expreſſed, we muſt have twice A F equal to 1000 feet, or the ſpeaker muſt ſtand about 500 feet from the obſtacle B C, and ſo in proportion for any other number of ſyllables.

ECHO, in architecture, a term applied to certain kinds of vaults and arches, moſt commonly of elliptical and parabolical figures, uſed to redouble ſounds, and produce artificial echoes.

We learn from Vitruvius, that in ſeveral parts of Greece, and Italy, there were brazen veſſels artfully ranged under the ſeats of the theatres, to render the ſound of the actors voices more clear, and make a kind of echo. A ſingle arch or concavity can ſcarce ever ſtop and reflect the ſound; but if there be a convenient diſpoſition between it, part of the ſound that is propagated thither, being collected and reflected as before, will preſent another echo; or if there be another concavity oppoſed at a due diſtance to the former, the ſound reflected from the one upon the other

other will be toſſed back again upon this latter, *&c.*

Echo, in poetry, a kind of compoſition wherein the laſt words or ſyllables of each verſe contain ſome meaning, which being repeated apart, anſwers to ſome queſtion or other matter contained in the verſe, as in this beautiful one from Virgil:

Crudelis mater magis, an puer improbus ille?
Improbus ille puer, crudelis tu quoque mater.

The elegance of an echo conſiſts in giving a new ſenſe to the laſt words; which reverberate, as it were, the motions of the mind, and by that means affect it with ſurpriſe and admiration.

ECHOMETER, among muſicians, a kind of ſcale or rule, with ſeveral lines thereon, ſerving to meaſure the duration and length of ſounds, and to find their intervals and ratios.

ECLECTICS, *eclectici*, antient philoſophers, who, without attaching themſelves to any particular ſect, ſelected whatever appeared to them the beſt and moſt rational, from each.

Potamon of Alexandria was the firſt of the eclectics: he lived in the reigns of Auguſtus and Tiberius; and being tired with the ſcepticiſm of the pyrrhonians, he reſolved upon a ſcheme that would allow him to believe ſomething, but without being ſo implicit as to ſwallow any entire hypotheſis.

ECLIPSE, in aſtronomy, the deprivation of the light of the ſun, or of ſome heavenl body, by the interpoſition of another heavenly body between our ſight and it. Thus, eclipſes of the ſun happen by the moon's intervening between it and the earth; by which means the ſhadow of the moon falls upon the earth, when the latitude of the moon does not prevent it, by elevating the moon above, or depreſſing it below the earth. On the other hand, an eclipſe of the moon can only happen when the earth is interpoſed between the ſun and it; for then, if the latitude of the moon does not prevent it, the ſhadow of the earth may fall on the moon, and thereby cauſe either a partial or total eclipſe. A total eclipſe of the ſun or moon is when their whole bodies are obſcured; and a partial one is when part only of their bodies is darkened: again, a central eclipſe is when it is not only total, but the eclipſed body paſſes through the center of the ſhadow.

Aſtronomy of Eclipses. The ſun being a luminous body, vaſtly larger than the earth, will enlighten ſomewhat more than one half of it, and cauſe it project a long conical ſhadow, as repreſented in plate LXXXIII. n° 1. where S is the ſun, E the earth, and H B D its conical ſhadow.

The height or length of this ſhadow, at the mean diſtance of the ſun, may be found by this proportion: as the tangent of the angle C B D, or the ſemi-diameter under which the ſun appears at the earth, *viz.* A S = 16′ : radius : : 1 : the length of the ſhadow C B = 214.8 ſemi-diameters of the earth: but when the ſun is at its greateſt diſtance, the length of the ſhadow C B will be equal 217 of theſe ſemi-diameters. Hence it appears, that though the height of the ſhadow is near three times as great as the mean diſtance of the moon, yet it falls far ſhort of the diſtance of mars, and conſequently can eclipſe none of the heavenly bodies but the moon.

To find the height of the moon's ſhadow, ſuppoſed to be ſimilar to that of the earth, and conſequently proportional to the diameters of the baſes, the proportion is, as the diameter of the earth 100 to the diameter of the moon 28, ſo is the mean altitude of the earth's ſhadow, 214.8 to the altitude of that of the moon 60 $\frac{144}{1000}$ of the earth's ſemi-diameters. The ſhadow of the moon therefore will juſt reach the earth in her mean diſtance, which it cannot do in her apogee; but in her perigee it will involve a ſmall part of the earth's ſurface.

Beſides the dark ſhadow of the moon, there is another, called the penumbra; to repreſent which, let S (plate LXXXIV. n° 2.) be the ſun, T the earth, D the moon, K C F and A B E the two lines touching the oppoſite limbs of the ſun and moon; then it is evident that C F E B will be the dark or abſolute ſhadow of the moon, in which a perſon on the earth's ſurface, between F and E, is wholly deprived of the ſun's light. Again, let K B G and A C H be two other lines touching the ſides of the ſun and moon alternately, and interſecting each other at the point I above the moon; then will H C B G, a fruſtum of the cone G I H, be the penumbra above-mentioned, in which a ſpectator on the earth's ſurface, between F and H, and E and G, will ſee part of the ſun, whilſt the reſt is eclipſed.

To

ECLIPSE

No. 1

S S F B A I K L M V Z T Y G C N Q O E R H P

No. 2

S K A I C D B N F E H T G

T. Jefferys sculp

To calculate the angle of the cone H I G, draw S B; then in the oblique triangle B I S, the external angle B I D is equal to both the internal and oppofite angles I B S and I S B; but I S B, the angle under which the femi-diameter appears at the fun, being infenfibly fmall, the angle B I D will be equal to I B S, or K B S, equal to the apparent femi-diameter of the fun. Therefore the part of the penumbral cone C I B is equal and fimilar to the dark fhadow of the moon.

Next, to find how much of the earth's furface can be at any time involved in the moon's dark fhadow, or the quantity of the arch E F (plate LXXXIII. n° 1.) let us fuppofe the fun to be in apogee, and the moon in perigee; and, in this cafe, the height of the moon's fhadow will be about 61 femi-diameters, and the diftance of the moon about 56; that is D K = 61, D T = 56, and T E = 1. In this cafe alfo, the half angle of the fhadow T K E = 15′ 50″, as being leaft of all. Then the proportion is: as 1, or the fide T E to the fide T K = 5; fo is the fine of the femi-angle T K E = 15′ 50″ to the fine of the angle T E K = 1° 19′ 10″. Wherefore T E K + T K E = A T E = A E = 1° 35′; the double of which F E is 3° 10′ = 190′, or 220 miles, the diameter of the dark fhadow on the furface of the earth when greateft.

After a like manner you may find the diameter of the penumbral fhadow at the earth, G E F H (plate LXXXIV. n° 2.) when greateft of all, that is, when the earth is in perihelio, and the moon in apogee; for then will the fun's apparent diameter be equal to 16′ 23″ = T I G, the greateft femi-angle of the cone; and thence we fhall find I D = 58½ femi-diameters of the earth. In this cafe alfo, the diftance of the moon from the earth is D T = 64 femi-diameters. Therefore as T G = 1 to T I = 122½, fo is the fine of the angle T I G = 16′ 23″ to the fine of the angle I G N = 35° 42′. But I G N = T I G + I T G, and therefore I T G = I G N − T I G = 35° 25′; the double of which 70° 50′ = G E F H = 4900 englifh miles nearly, for the diameter of the penumbral fhadow when greateft.

From the principles of optics it is evident, that if the plane of the moon's orbit coincided with that of the earth's orbit, there would neceffarily be an eclipfe of the fun every new moon: thus, if S (plate LXXXIV. n° 1.) reprefent the fun, B the moon, and T the earth, fince the apparent magnitude or difc of the fun is nearly the fame with that of the moon, it muft neceffarily be hid or eclipfed as often as the new moon came between the earth and the fun. But if, as is really the cafe, the moon's orbit be not in the plane of the ecliptic, but inclined thereto under a certain angle, there may be a new moon, and yet no eclipfe of the fun. To illuftrate this, let A B C D E be a circle in the plane of the ecliptic, defcribed at the diftance of the moon's orbit F G H, interfecting the fame in the points B and D, and making an angle therewith A B F, whofe meafure is the arch G C, as being 90° diftant from the angular points or nodes B and D. Now it is evident if the arch G C be fomewhat greater than the fum of the apparent femi-diameters of the fun and moon, then at G, and fome diftance from G towards B, there may be a new moon, and yet no eclipfe of the fun; becaufe, in this cafe, the difc of the moon G is too much elevated or depreffed above or below the apparent difc or face of the fun C, to touch it, much lefs to hide or eclipfe any part thereof. But at a certain point M (*ibid.*) in the moon's orbit, the moon will have a latitude only equal to the fum of the femi-diameters of the fun and moon; and, therefore, when the moon is new in that point, fhe will appear to a fpectator in the point Z, to touch the fun only; from whence this point M is called the ecliptic limit, inafmuch as it is impoffible there fhould happen a new moon in any part between it and the node B on each fide, without eclipfing the fun lefs or more: thus, in the figure, may be feen a partial eclipfe at K, and a total one in the node itfelf B.

What has hitherto been faid regards the phænomenon of an eclipfe of the fun, as it appears to a fpectator on the earth's furface, in whofe zenith the moon then is, and where there is no refraction to alter the true latitude of the moon: but when the moon has any latitude, there the procefs of calculating the appearances of a folar eclipfe will be fomewhat more complex, on account of the variation of the moon's latitude and longitude for every different altitude, and confequently every moment of the eclipfe. See the articles Refraction and Parallax.

The beft way of reprefenting a folar eclipfe is by a projection of the earth's difc, and of the fection of the dark and penumbral fhadow

dow, as they appear, or would appear, to a ſpectator at the diſtance of the moon in a right line joining the centers of the ſun and the earth. In order to this, we are to find the dimenſions of the apparent ſemi-diameters of the earth, dark ſhadow, and penumbra at the diſtance of the moon. As to the firſt, *viz.* the earth's ſemi-diameter, it is equal to the moon's horizontal parallax. That of the dark ſhadow is thus eſtimated: let C (plate LXXXIII. n° 5.) be the center of the moon, D B its diameter, D H B its dark ſhadow and K A L the penumbral cone. Then let E F be the diameter of the penumbra at the earth, and I G that of the dark ſhadow, and draw C G and C E; then is the angle $CGB = BHC + GCH$, and ſo $GCH = BGC - BHC$; that is, the apparent ſemi diameter of the dark ſhadow, is equal to the difference between the apparent ſemi-diameters of the ſun and moon. In like manner the angle $ECH = DEC + DAC$; that is, the apparent ſemi-diameter of the penumbra, at the earth, is equal to the ſum of the apparent ſemi-diameters of the moon and ſun. Now the ſemi-diameters of the ſun and moon, and alſo of the moon's horizontal parallax, are all ready calculated for their various diſtances from the earth, and for the leaſt, mean, and greateſt excentricity of the lunar orbit, in the aſtronomical tables. Therefore, let A E (plate LXXXIII. n° 3.) repreſent a ſmall portion of the annual orbit, and F H the viſible path of the center of the lunar ſhadows, which will exactly correſpond to the poſition of the moon's orbit with reſpect to the ecliptic in the heavens; ſo that the point of interſection ☊ will be the node, and the angle H ☊ E the angle of inclination of the lunar orbit to the plane of the ecliptic, which is about 5°. Hence, if Æ P Q S repreſent the diſc of the earth, according to the orthographic projection, in the ſeveral places ☊, B, C, D, whoſe ſemi-diameter is made equal to the number of minutes in the moon's horizontal parallax at the time of the eclipſe; and if, in the path of the ſhadows in the points ☊, R, N, G, we deſcribe a ſmall circle whoſe ſemi-diameter is equal to the difference of the ſemi-diameters of the ſun and moon, that will be the circular ſection of the moon's dark ſhadow at the diſtance of the earth: again, if a circle is deſcribed on the ſame center, with a ſemi-diameter equal to the ſum of the ſemi-diameters of the ſun and moon, it will repreſent the penumbral ſhadow, expreſſed by the dotted area. Here then it is evident, that if the moon, when new, be at the diſtance ☊ G (*ibid.*) from the node, the penumbral ſhadow will not fall near the earth's diſc, and ſo there cannot poſſibly happen an eclipſe. Again, if the moon's diſtance from the node be equal to ☊ N, the penumbral ſhadow will juſt touch the diſc, and conſequently ☊ C is the ecliptic limit, which may be found by the following analogy, *viz.* as the ſine of the angle N ☊ C = 5° 30′ (the angle of inclination of the lunar orbit to the plane of the ecliptic) is to the radius = 90°, ſo is the logarithm of the ſide $NC = TC + NT = 62' 10'' + 16' 52'' + 16' 23'' = 95' 25''$ to the logarithm of the ſide ☊ C equal to the ecliptic limit, which is found to be 16° 36′, beyond which diſtance from the node ☊ there can be no eclipſe; and within that diſtance, if the moon be new, the ſhadow will fall on ſome part of the earth's diſc, as at B; where all thoſe places over which the ſhadows paſs, will ſee the ſun eclipſed, in part only by the dotted penumbral ſhadow; but the ſun will be centrally eclipſed in all places over which the center of the ſhadows paſs, and if the moon be new in the node, then will the center of the ſhadows paſs over the center of the diſc, as repreſented at ☊. In this caſe, if the apparent diameter of the moon be greater than that of the ſun, the face of the ſun will be wholly eclipſed to all places over which the center of the ſhadow paſſes; but if not, the ſun will only be centrally eclipſed, his circumference appearing in the form of a bright annulus, or luminous ring; the width whereof will be equal to the difference of the diameters of the luminaries. The diſc of the earth, here projected, repreſents the caſe of an eclipſe on an equinoctial day; A K being the ecliptic, Æ Q the equator, X Y the axis of the ecliptic, P S the axis of the equator, P and S the north and ſouth poles, *&c.* By this projection the paſſage of ſhadows over the earth's diſc may be exhibited for any place of the ſun, or declination of the moon.

As to the calculation of eclipſes of the ſun, it is at beſt but a troubleſome buſineſs, which depends upon the following data: 1. The mean conjunction, and from thence the true conjunction, together with the place of the luminaries at the apparent time of true conjunction. 2. The apparent time of the viſible new moon

moon, at the apparent time of the true conjunction. 3. The apparent latitude at the apparent time of the visible conjunction. From these data, the other quæsita may be obtained; so that the greatest part of the trouble arises from the parallaxes of longitude and latitude, without which the calculation of solar eclipses would be the same with that of lunar ones.

Astronomy of lunar ECLIPSES. These being occasioned by the immersion of the moon into the earth's shadow, all that we have to do, in order to delineate a lunar eclipse, is to calculate the apparent semi-diameter of the earth's shadow at the moon. Thus, let A B (plate LXXXIII. n° 6.) represent the earth, T its center, A E B its conical shadow, D C the diameter of a section thereof at the moon; and drawing D T, we have the outward angle A D T = D T E + D E T; so that D T E = A D T − D E T; that is, the angle D T E, under which the semi-diameter of the earth's shadow appears at the distance of the moon, is equal to the difference between the moon's horizontal parallax A D T, and the semi-diameter of the sun D E T. If, therefore, A E, (*ibid.* n° 4.) represent the path of the earth's shadow at the distance of the moon near the node ☋, and F H a part of the lunar orbit, and the section of the earth's shadow be delineated at ☋, B, C, D; and the full moon at ☋, I, N, G; then it is evident there can be no eclipse of the moon, where the least distance of the centers of the moon and shadow exceeds the sum of their semi-diameters, as at D. But where this distance is less, the moon must be eclipsed either in part or wholly as at B and ☊; in which latter case the moon passes over the diameter of the shadow. But in a certain position of the shadow, as at C, the least distance of the centers N C, is equal to the sum of the semi-diameters; and consequently ☋ C is the ecliptic limit for lunar eclipses: to find which, we have this analogy, as the sine of the angle N ☋ C = 5° (the inclination of the moon's orbit to the plane of the ecliptic) is to the radius, so is the logarithm of the side N C = 63′ 12″ to the logarithm of the side ☋ C = 12° 5′ = the ecliptic limit. Hence, if the moon be at a less distance from the node ☋ than 12° 5′, there will be an eclipse; otherwise none can happen.

If the earth had no atmosphere, the shadow would be absolutely dark, and the moon involved in it quite invisible; but, by means of the atmosphere, many of the solar rays are refracted into, and mixed with the shadow, whereby the moon is rendered visible in the midst of it, and of a dusky red colour.

For calculating eclipses of the moon, the following data are necessary: 1. Her true distance from the node, at the mean conjunction. 2. The true time of the opposition, together with the true place of the sun and moon, reduced to the ecliptic. 3. The moon's true latitude, at the time of the true conjunction, and the distance of the luminaries from the earth: also their horizontal parallaxes, and apparent semi-diameters. 4. The true horary motions of the moon and sun, and the apparent semi-diameter of the earth's shadow. With these data it is easy to find the duration, beginning, middle, and quantity of eclipses.

ECLIPSES *of Jupiter's satellites.* See the articles SATELLITE and JUPITER.

ECLIPTIC, in astronomy, a great circle of the sphere, supposed to be drawn thro' the middle of the zodiac, making an angle with the equinoctial of about 23° 30′, which is the sun's greatest declination: or, more strictly speaking, it is that path or way among the fixed stars, that the earth appears to describe, to an eye placed in the sun.

Some call it *via solis*, the way of the sun, because the sun, in his apparent annual motion, never deviates from it, though all the planets do, more or less. See the articles GLOBE and ZODIAC.

It is called ecliptic, by reason all eclipses happen when the planets are in or near its nodes. See the article NODE.

The axis of the ecliptic is a right line supposed to pass through the center of the sun, and to be perpendicular to the plane of the ecliptic; and the points in the heavens, to which this axis points, are called the poles thereof; and the great circles, passing through these poles, will be perpendicular to its plane, and therefore are called its secondaries, and sometimes circles of longitude.

As to the obliquity of the ecliptic, or angle which its plane makes with that of the equinoctial, it is found to vary; the mean obliquity being found, by Dr. Bradley to be 23° 28′ 30″, who supposes this variation may be owing to a nutation of the earth's axis, or to a gradual approach of the ecliptic to the equinoctial, at about the rate of 1′ in 100 years.

ECLIPTIC, in geography, a great circle on the terreftrial globe, not only anfwering to, but falling within the plane of the celeftial ecliptic. See GLOBE.

ECLOGUE, εκλογη, in poetry, a kind of paftoral compofition, or a fmall elegant poem, in a natural fimple ftyle. See the article PASTORAL.

The eclogue, in its primary intention, is the fame thing with the idyllium, but cuftom has made fome difference between them, and appropriated the name eclogue to pieces wherein fhepherds are introduced, and idyllium to thofe written like eclogues, but without any fhepherds in them. The eclogue then is properly an image of paftoral life, upon which account the matter is low, and its genius humble. Its bufinefs is to defcribe the loves, fports, piques, jealoufies, intrigues, and other adventures of fhepherds; fo that its character muft be fimple, the wit eafy, and the expreffion familiar. Then the true character of the eclogue is fimplicity and modefty; its figures are neat, the paffions tender, the motions eafy, and though fometimes it may have little tranfports, and defpairs, yet it never rifes fo high as to be fierce or violent. Its narrations are fhort, defcriptions little, the thoughts ingenious, the manners innocent, the language pure, the verfe flowing, the expreffions plain, and all the difcourfe natural.

The models in this fort of poetry are Theocritus and Virgil, who both have fome eclogues of a lofty character. The eclogue therefore occafionally raifes its voice: yet M. Fontenelle blames fome modern poets for having made matters of high concern the fubject of fome of their eclogues, and caufed their fhepherds fing the praifes of kings and heroes. The Italians are thought faulty in this refpect, for aiming generally to be too witty or fuperbe in their ftyle: however, fince the eftablifhment of the Academy of Arcadians at Rome, the tafte for eclogues has been greatly improved amongft them. Some imagine the name eclogue to have been originally applied to fuch poems as were wrote in imitation of others: fuch are the Eclogues of Virgil, which are only imitations of Theocritus.

ECLOGUE is alfo applied to certain compofitions in profe: fuch are thofe of Strabo, Diodorus, *&c.* in which fenfe, the word fignifies only an extract, or collection.

ECOUTE', in the manege, a pace or motion of a horfe, when he rides well upon the hands and the heels, is compactly put upon his haunches, and hears or liftens to the heels or fpurs, and continues duly balanced between the heels, without throwing to either fide. This happens when a horfe has a fine fenfe of the aids of the hand and heel.

ECPHORA, in architecture, commonly fignifies the diftance between the extremity of a member or moulding, and the naked of the column, or any other part it projects from.

Some authors, however, account for the ecphora from the axis of the column, and define it to be the right line intercepted between the axis and the outermoft furface of a member or moulding.

ECPHRACTICS, in medicine, remedies which attenuate and remove obftructions. See the articles ATTENUANTS and DEOBSTRUENTS.

ECPIESMA, in furgery, a fort of fracture of the cranium, when the bones are much fhattered, and, preffing inwardly, affect the membranes of the brain.

ECPIESMA, in pharmacy, fignifies the mafs remaining after the juices of vegetables have been preffed out: and, in this fenfe, is the fame as magma. It fometimes further imports the juice preffed out.

ECPIESMUS, εκπιεσμος, in the antient writers of medicine, a word ufed to exprefs a diftemperature of the eye, confifting in a very great prominence of the entire globe of the eye, which is, as it were, thruft out of its focket or orbit, by a great flux of humours, or an inflammation.

ECSTATICI, εκςατικοι, in grecian antiquity, a fort of diviners, who were caft into trances or ecftafies, in which they lay like dead men, or perfons afleep, deprived of all fenfe or motion, but after fome time (it may be days, or months, or years, for Epimenides the Cretan is reported to have lain in this pofture feventy-five years) returning to themfelves, gave ftrange relations of what they had feen and heard.

ECTASIS, in grammar, the fame with diaftole. See the article DIASTOLE.

ECTHESIS, in church-hiftory, a confeffion of faith, in the form of an edict, publifhed in the year 649, by the emperor Heraclius, with a view to pacify the troubles occafioned by the eutychian herefy in the eaftern church. However, the fame prince revoked it, on being informed that pope Severinus had condemned it, as favouring the monothelites; declaring at the fame time, that Sergius, patriarch

patriarch of Conſtantinople, was the author of it. See the article TYPE *of Conſtance*.

ECTHLIPSIS, ἔκθλιψις, among latin grammarians, a figure of proſody whereby the *m* at the end of a word, when the following word begins with a vowel, is elided, or cut off, together with the vowel preceding it, for the ſake of the meaſure of the verſe: thus they read *mult' ille*, for *multum ille*.

The reaſon of an ecthlipſis, which in latin verſe ought always to take place when the immediately following word begins with a vowel, is to prevent the harſhneſs of an hiatus, or concourſe of vowels.

ECTROPIUM, in ſurgery, is when the eye-lids are inverted, or retracted, ſo as to ſhew their internal or red ſurface, and cannot ſufficiently cover the eye. Sometimes this is a ſimple or original diſorder, and ſometimes only a ſymptom, or conſequence of another, as an inflammation, ſarcoma, tumour, &c. When the diſorder is ſimple, or original, it generally ariſes from a contraction of the ſkin of the eye-lid, by the ſcar of a wound, ulcer, burn, &c. or from an induration and contraction of the ſkin after an inflammation; and ſometimes it may proceed, in a great meaſure, from the uſe of aſtringent collyria injudiciouſly applied, in diſorders of the eyes.

The cure of this diſorder conſiſts in elongating, or relaxing, the external ſkin of the eye-lid ſo as to cover the eye. When the diſorder is recent, it will be beſt to try the application of emollients, ſuch as the vapours of hot milk or water, oil of almonds, or olives, mucilage of quince-ſeeds, hare's foot, ung. dialthææ, &c. to be continued for ſeveral days on the ſcar, or contracted ſkin of the eye-lid, which muſt be often extended, either upwards or downwards, according as the diſorder is in the upper or lower lid. And every night, when the patient goes to bed, it will be proper to bring the eye-lids cloſe to each other, and to reſtrain them cloſe by plaſter, compreſs, and bandage, to be renewed every night. If none of theſe means take effect, it will be proper firſt to make a ſemilunar inciſion in the external ſkin of the eye-lid, next its tarſus; making the angles of the inciſion downwards in the upper lid, and upward in the lower lid, that the ſkin may be elongated. If the ſkin does not appear to be let out enough by one inciſion, two or three more muſt be made, running parallel to the firſt, and about the diſtance of a ſmall packthread from each other, and when the eye-lid is thus ſufficiently elongated, the inciſions muſt firſt be ſtuffed with dry lint, and then with lint armed with vulnerary ungent; and laſtly, a piece of ſticking plaſter ſhould be faſtened to the margin of the eye-lid, to keep it extended either up or down; which method ſhould be continued till the eye-lids ſhut cloſe. When the diſorder ariſes from an inflammation, or fleſhy excreſcence within the eye-lid, the inflammation muſt be removed, and arming the eye with a defenſitive plate, the excreſcence muſt be removed by lapis infernalis. When the ſkin of the eye-lid has continued violently diſtorted from the patient's birth, there are ſeldom any hopes of curing it.

ECTYLOTICS, in pharmacy, remedies proper for conſuming calloſities. See the article CALLUS.

ECTYPE, ἔκτυπον, among antiquarians, an impreſſion of a medal, ſeal, or ring, or a figured copy of an inſcription, or other antient monument.

ECU, or ESCU, a french crown, for the value of which ſee the article COIN.

ECUSSON, in heraldry, a little eſcutcheon. See the article ESCUTCHEON.

EDDISH, or EADISH, the latter paſture, or graſs that comes after mowing, or reaping; otherwiſe called eagraſs, earſh, and etch.

EDDY-TIDE, or EDDY-WATER, among ſeamen, is where the water runs back contrary to the tide; or that which hinders the free paſſage of the ſtream, and ſo cauſes it to return again.

EDDY-WIND is that which returns, or is beat back from a ſail, mountain, or any thing that may hinder its paſſage.

EDGE, in general, denotes the ſide or border of a thing; but is more particularly uſed for the ſharp ſide of ſome weapon, inſtrument, or tool: thus we ſay, the edge of a ſword, knife, chiſſel, &c. In the ſea-language, a ſhip is ſaid to edge in with another, when making up to it.

EDGINGS, among gardeners, the ſeries of ſmall but durable plants, ſet round the edges or borders of flower-beds, &c. The beſt and moſt durable plants for this uſe is box, which, if well planted, and rightly managed, will continue in ſtrength and beauty for many years. The ſeaſons for planting theſe are the autumn and very early in the ſpring; and the beſt ſpecies for this purpoſe is the dwarf dutch box. The edgings of box are now only planted

ed on the fides of borders next walls, and not, as was fome time fince the fafhion, all round borders, or fruit-beds, in the middle of gardens, unlefs they have a gravel-walk between them, in which cafe it ferves to keep the earth of the borders from wafhing down on the walks in hard rains, and fouling the gravel. Daifies, thrift, or fea-july-flowers, and chamomile are alfo ufed, by fome, for this purpofe; but they grow out of form, and require yearly tranfplanting.

EDICT, *edictum*, in matters of polity, an order or inftrument, figned and fealed by a prince, to ferve as a law to his fubjects. We find frequent mention of the edicts of the prætor, the ordinances of that officer in the roman law. In the french law, the edicts are of feveral kinds; fome importing a new law or regulation; others, the erection of new offices; eftablifhments of duties, rents, &c. and fometimes articles of pacification. In France edicts are much the fame as a proclamation is with us, but with this difference, that the former have the authority of a law in themfelves, from the power which iffues them forth; whereas the latter are only declarations of a law, to which they refer, and have no power in themfelves. Edicts can have no room in Britain, becaufe that the enacting of laws is lodged in the parliament, and not in the king. Edicts are all fealed with green-wax, to fhew that they are perpetual and irrevocable.

EDIFICE, the fame with building. See the article BUILDING.

EDILE, or ÆDILE. See ÆDILE.

EDINBURGH, the capital city of Scotland, fituated about one mile fouth of Leith and of the frith of Forth, eighty-two miles north weft of Newcaftle, and about four hundred north weft of London: weft long. 3°, and north lat. 56°. Here the parliament of that antient kingdom ufed to affemble, before its union with England; and here the fupreme courts of juftice for North Britain are ftill held. It has likewife a celebrated univerfity, and exceeds all the cities of the world, for the loftinefs of its buildings, which are all of hewn ftone, fafhed, and ten, eleven, or more ftories high: it is alfo remarkable for the fpacioufnefs of its High-ftreet, its Caftle, the palace of Holyrood-houfe, &c.

EDITOR, a perfon of learning, who has the care of an impreffion of any work, particularly that of an antient author; thus Erafmus was a great editor; the Louvain doctors, Scaliger, Petavius, F. Sirmond, bifhop Walton, Mr. Hearne, Mr. Ruddiman, &c. are likewife famous editors.

EDMOND'S BURY. See BURY.

EDUCATION, the inftructing children, and youth in general, in fuch branches of knowledge and polite exercifes, as are fuitable to their genius and ftation. Education is a very extenfive fubject, that has employed the thoughts and pens of the greateft men: Locke, the archbifhop of Cambray, Tanaquil Faber, Mr. Croufaz, and Rollin may be confulted on this head.

The principal aim of parents fhould be, to know what fphere of life their children are defigned to act in; what education is really fuitable for them; what will be the confequence of neglecting that; and what chance a fuperior education will give them, for their advancement in the world. Their chief ftudy fhould be to give their children fuch a degree of knowledge, as will qualify them to fill fome certain poft or ftation in life: in fhort, to fit them for an employment fuited to their condition and capacity, fuch as will make them happy in themfelves, and ufeful to fociety.

The education of a nobleman fhould contain every thing that is both ufeful and ornamental. Next to languages, he ought to be inftructed in philofophy and hiftory, particularly the hiftory of his own nation. He fhould alfo be made acquainted with the cuftoms, laws, and manners of different ftates, but more efpecially with the conftitution of his own country. To this folid learning fhould be added the embellifhment of polite literature, poetry, painting, and mufic; and, to complete the education, dancing, fencing, riding, and architecture.

As to the education of gentlemen, the plan above laid down will in general hold good. Every gentleman of fortune fhould certainly give all his fons the education of gentlemen; but the eldeft ought to be graced with every ornament. Parents of this clafs, befides carefully attending to the genius, temper, and inclinations of their younger fons, fhould refolve on an employment fuited to them; which being fettled, they are to purfue their education accordingly. The three learned profeffions, divinity, law, and phyfic, require each a fpecies of learning proper to itfelf. But befides thefe, the fea, the army, and the exchange, with many

other genteel employments, are open for them to engage in: and hence appears not only the neceſſity of conſidering their fortune, but attending to their genius, temper and inclinations.

As many among the mercantile claſs are deſcended of the beſt gentlemen's families, and as intermarriages are frequent between them, it is highly proper that their children ſhould be genteelly educated. However, even in this, regard ſhould be had to their own fortune, and the real proſpects before them: for nothing can be a greater misfortune than to educate a boy like a fine gentleman, and not be able to ſupport it. A learned education is needleſs, in the caſe before us; but reading, writing, arithmetic, geography, and drawing, are extremely proper, or rather abſolutely neceſſary.

With regard to manners, the quality ſhould be cautioned never to ſink beneath their rank; and while they learn to be humble, they muſt carefully avoid being mean. The gentry ſhould approach as near to the quality in good behaviour, and politeneſs, as poſſible: and as to the trading part of the people, they ſhould be taught that every thing coarſe, vulgar, and mean is highly unbecoming them; is not only abuſing the faculties providence has furniſhed them with, but is debaſing their nature.

Before we conclude this article, it will be proper to take notice of the impropriety and inconvenience of not teaching young people to think and act of themſelves. The art of a governor, and the leſſons of a preceptor, change a child into a youth; they infuſe into him a greater ſhare of knowledge than he could be naturally ſuppoſed to have at his age. But this very child, when he arrives to that ſtage of life in which he muſt think, ſpeak, and act of himſelf, is ſtripped all of a ſudden of his premature merit. His ſummer is far from anſwering the fine bloſſoms of his ſpring. The too ſolicitous education he has received, becomes rather prejudicial to him, by reaſon of its being the occaſion of his falling into the dangerous habit of letting other people think for him. His mind has contracted an internal lazineſs, which makes him wait for external impulſes to reſolve and to act. The mind contracts a lazineſs with as much facility as the legs and feet. A man who never ſtirs without the aſſiſtance of ſome vehicle, becomes ſoon incapable of the ſame free uſe of his legs, as a perſon that has been conſtantly accuſtomed to walk. As, therefore, we muſt lend a hand to the one when he walks, ſo we muſt help the other to think, and even to will: whereas in a child bred up with leſs care, his inward part labours of itſelf, and his mind grows active. He learns to reaſon and determine of himſelf, in the ſame manner as other things are learned. At length he attains to argue and reſolve rightly, by mere dint of reaſoning and reflecting on the cauſe of his deception, when the events convince him of the error of his judgment.

EDULCORATION, in pharmacy, the ſame with dulcifying. See the article Dulcifying.

Edulcoration, in chemiſtry, the ſeparating, by a waſhing, or ſolution, in water, the ſalt that any body may be impregnated with, or thoſe that may be left adhering to a body, after any operation. See the article Ablution.

The ſolution here ſpoke of, is in metals only, and is properly a kind of moiſt one, the ſaline parts adhering to bodies not ſoluble in water, being by that menſtruum taken up, and eaten off from the body, and the ſolution afterwards ſeparated from the remaining ſolid, either by ſubſidence or filtration. See the article Filtration.

It is proper in this operation to enlarge the ſurface of the body to be edulcorated, by pounding it in a mortar, that the ſolution may have the ſpeedier ſucceſs; and for this purpoſe it ſhould always be kept ſtirring with a ſtick, while the water is on it, that all the parts of the body to be edulcorated, which otherwiſe would ſome of them ſink to the bottom, may be made equally, at one time or other, contiguous to the particles of the edulcorating fluid, by which all the ſolutions are greatly facilitated. Boiling water is, in ſome caſes, requiſite; for the heat of that, by the inward motion and rarefaction it occaſions, promotes in an extraordinary manner ſaline ſolutions. Very frequent repetitions of this operation are neceſſary; and, after all, a nice experiment will always find ſome ſmall portion of ſalts remaining.

EEL, *anguilla*, in ichthyology, a ſpecies of muræna. See Muræna.

The common eel is the ſimple coloured muræna, with the lower jaw longeſt: it has three fins, *viz.* two pectoral ones, ſtanding one on each ſide; and a ſingle low back-fin, which beginning at ſome

diſtanc

diftance from the head, runs along the back to the tail, and comes up again continuous as far as the anus: the extremity of this fin, which forms what may be called the tail, is neither round nor fquare, but fubacute. See plate LXXXV. fig. 1.

It is common in all our frefh waters, ponds, ditches, and rivers; and its general ftandard is about two feet in length, though fome are often caught much larger.

The fat of eels is accounted vulnerary, and good in an alopecia, cafes of deafnefs, and the hæmorrhoids.

Eel-fifhing is of divers kinds, as fniggling, bobbing, &c. See FISHING.

The filver-eel may be catched with feveral forts of baits, as powdered beef, lobs, or garden-worms, minnows, hens guts, fifh-garbage, &c. The moft proper time for taking them is in the night, faftening your line to the bank-fides, with your laying-hook in the water: or a line may be thrown with good ftore of hooks, baited and plummed, with a float to difcover where the line lies, that they may be taken up in the morning.

Microfcopic EELS, thofe difcovered by the microfcope in pepper-water and other infufions of plants, as well as in the feed of moft animals. See ANIMALCULE.

They are otherwife called capillary eels, or enchelides. See ENCHELIDES.

Sea-EEL, *anguilla marina*, a fifh otherwife called conger; being a fpecies of muræna, with the upper edge of the backfin black. See the articles CONGER and MURÆNA.

EEL-BACKED, an appellation given to fuch horfes as have black lifts along their back.

EEL-POUT, the englifh name of a fifh of the gadus-kind, with three fins on the back, cirri at the mouth, and the two jaws equal: the generality of authors call it muftela fluviatilis. See GADUS.

EEL-SPEAR, a forked inftrument with three or four jagged teeth, ufed for catching of eels: that with the four teeth is beft, which they ftrike into the mud at the bottom of the river, and if it ftrike againft any ells, it never fails to bring them up.

EFFARE', or EFFRAYE', in heraldry, a term applied to a beaft rearing on its hind legs, as if it were frighted or provoked.

EFFECT, in a general fenfe, is that which refults from, or is produced by, any caufe. See the article CAUSE.

EFFECTS, in commerce, law, &c. the goods poffeffed by any perfon, whether moveable or immoveable. See CHATTELS.

EFFECTS, in the manege, the motions of the hand that ferve to conduct the horfe. See the article AIDS.

There are four effects of the hand, or four ways of making ufe of the bridle, *viz.* to pufh a horfe forwards, to give him head, to hold him in, and to turn the hand either to the right or left.

EFFECTIONS, in geometry, are ufed in the fame fenfe with the geometrical conftruction of propofitions, and often of problems and practices, which, when they are deducible from, or founded upon, fome general propofition, are called the geometrical effections thereunto belonging.

EFFERVESCENCE, in a general fenfe, fignifies a flight degree of ebullition in liquors expofed to a due degree of heat: but the chemifts apply it to that inteftine motion excited in various fluids, either by the mixture of fluids with others of a different nature; or by dropping falts, or powders, of various kinds into fluids.

The two moft common oppofites, acids and alkalies, on being mixed, caufe a great ebullition, or frothing, but no great heat: but the folution of fome metals in aquafortis, caufe intenfe heat, and emit flame. The mixing aromatic oils with acid mineral fpirits, actually kindle and burn with violent explofions; and fome vegetable fubftances, putrifying with moifture, will, fometimes, heat fo as to kindle whatever lies dry about that part of the heap where the putrefaction happens.

Hence, effervefcences are diftinguifhed into hot and cold; that which produces heat in the fubftances fo mixt, is called a hot effervefcence, but if no heat is excited, it is called a cold effervefcence. Among the mixtures that excite a cold effervefcence, is that of powdered coral mixt with diftilled vinegar; which is accounted for hence, by Chauvin, that the pores of the coral being very great, it may be eafily diffolved in the acid fpirit, without any great friction, or collifion of the parts, fuch as would be neceffary to generate any confiderable heat.

The principal bodies in which effervefcences happen, according to Boerhaave, are, 1. Native vegetable acids, as moft juices of trees, fhrubs, and plants that run in the fpring; moft juices of unripe fummer fruits; particular juices, remaining acid when ripe, as of oranges, citrons, lemons,

lemons, tamarinds, forrel, wood-forrel; fermented acid vegetables, as the meals when they turn four; rhenifh and Mofelle wine, and tartar vegetables twice fermented; native and diftilled vinegars; the acids of animals from tartifh or acid vegetable aliment, as in the chyle, four milk, whey, butter-milk. 2. The native acids of foffils; as the acid of fulphur, alum or vitriol; or thofe acids as they lye concealed in fulphur, or vitriol ftones; or as thence extracted by a violent fire; or a ftronger acid, as in the fpirit of nitre, falt, alum, vitriol, and fulphur. 3. True fixed alkalies, made of any vegetable matter, by burning the more volatile alkalies, whether fpontaneous, as in garlic, onions, fcurvy-grafs, muftard, *&c.* produced by putrefaction from animal or vegetable fubjects, or procured from the fame by diftillation and burning. 4. Certain bodies improperly called alkalies, only on account of agreeing therewith in fermenting with acids: thefe are almoft all the boles, bones, chalk, clays, coral, crab-eyes, earths, horns, hoofs, nails, pearls, fhells, ftones and teeth. 5. The feven metals, 6. The femi-metals; antimony, bifmuth, lapis calaminaris, lapis hæmatites, lime, *&c.*

Hence we have four general rules, *viz.* 1. The bodies of the firft clafs conftantly make an effervefcence with thofe of the fecond and third, either fooner or later, more or lefs; or as they are weak or ftrong. The effervefcence continues till the point of faturation is gained, then ceafes, and the acrimony, after a full faturation, is generally foftened. 2. The bodies of the firft clafs make an effervefcence with thofe of the fourth, and at the end of the faturation, vitriols are ufually produced. 3. The bodies of the firft clafs act in the fame manner with thofe of the fifth. 4. The bodies of the fecond, third, fourth, and fifth claffes, being mixed together, are fcarce found to make any effervefcence.

EFFERVESCENCE, in vintage, a term appropriated by Portzius and others, to fignify that working of wine which is by fome improperly called fermentation, thereby confounding two very different things. See the article FERMENTATION.

EFFICACIOUS, a term ufed by divines, in fpeaking of grace; importing fuch grace, as never fails to produce its effect.

EFFICIENT CAUSE. See CAUSE.

EFFICIENTS, in arithmetic, the fame with factors. See FACTOR.

EFFIGY, *effigies*, the portrait, figure, or exact reprefentation of a perfon.

EFFLORESCENCE, among phyficians, the fame with exanthema. See the article EXANTHEMA.

EFFLUENT FEVER, the fame with an inflammatory one. See the article INFLAMMATORY.

EFFLUVIUM, in phyfiology, a term much ufed by philofophers and phyficians, to exprefs the minute particles, which exhale from moft, if not all, terreftrial bodies in form of infenfible vapours. See the articles VAPOUR and EXHALATION. Sometimes indeed, thefe effluvia become vifible, and are feen afcending in form of fmoak; conftituting what, in animals and plants, makes the matter of perfpiration. See PERSPIRATION.

Nothing can exceed the fubtility of the odoriferous effluvia of plants, and other bodies. Mr. Boyle tells us, that having expofed to the open air a certain quantity of afa foetida, he found its weight diminifhed only the eighth part of a grain in fix days: hence, if we fuppofe, that during all that time a man could fmell the afa foetida at the diftance of five feet, it will appear that its effluvia cannot exceed the $\frac{1}{26250000000000000}$ part of an inch in magnitude.

The effluvia of mineral fubftances are called fteams; and when collected in mines, or other clofe places, damps. See the article DAMPS.

Malignant effluvia are affigned by phyficians, as the caufe of the plague, and other contagious difeafes; as the jail-diftemper, hofpital fever, and the like. See PLAGUE and HOSPITAL FEVER.

Effluvia iffuing from corrupted fubftances, according to the ingenious Dr. Pringle, chiefly confift of the phlogifton or fulphur-principle, only combined with the faline parts of the body: for this principle, when fingle, is perhaps imperceptible to our fenfe of fmelling; and, when divefted of thefe falts, is never peftilential: fo that the deleterious effluvia of rotten fubftances feem to confift of a certain combination of the fulphureous with the faline principle, which united, not only become the moft irritating ftimuli to the nerves, but act upon the humours as a putrid ferment, in promoting their corruption.

EFFUSION, in a general fenfe, the pour-

ing

ing out of any thing liquid, and that with some violence.

Effusion, in astronomy, part of the sign aquarius. See Aquarius.

EFT, in zoology, the english name of the common lizard, lacertus vulgaris, called also, in several parts of the kingdom, the newt and swift. See the article Lizard.

EGG, *ovum*, in physiology, a body formed in certain females, in which is contained an embryo, or fœtus of the same species, under a cortical surface, or shell.

The exterior part of an egg is the shell, which is in a hen, for instance, a white, thin, and friable cortex, including all the other parts. The shell becomes more brittle by being exposed to a dry heat. It is lined every where with a very thin, but pretty tough membrane, which, dividing at, or very near, the obtuse end of the egg, forms a small bag, where only air is contained. In new-laid eggs this folliculus appears very little, but becomes larger when the egg is kept.

Within this are contained the albumen, or white, and the vitellus, or yolk; each of which have their different virtues. See Albumen and Vitellus.

The albumen is a cold, viscuous, white liquor in the egg, differing in consistence, in its different parts. It is observed, that there are two distinct albumens, each of which are inclosed in its proper membrane; of these, one is very thin and liquid, and the other more dense and viscuous, and of a somewhat whiter colour, but, in old and stale eggs, after some days incubation, inclining to a yellow. As this second albumen covers the yolk on all sides, so it is itself surrounded by the other external liquid.

The albumen of a fecundated egg, is as sweet and free from corruption, during all the time of incubation, as it is in new laid eggs; as is also the vitellus. As the eggs of hens consist of two liquors separated one from another, and distinguished by two branches of umbilical veins, one of which goes to the vitellus, and the other to the albumen, so it is very probable that they are of different natures, and consequently appointed for different purposes. Aristotle says, that the vitellus is condensed by cold, but the albumen rather liquified. On the contrary, the albumen is condensed by fire; the vitellus retains its softness, if it be not burnt, and concretes more in boiling than in roasting. When the vitellus grows warm with incubation, it becomes more humid, and like melting wax, or fat; whence it takes up more space, for as the fœtus increases, the albumen insensibly wastes away, and condenses: the vitellus, on the contrary, seems to lose little or nothing of its bulk, when the fœtus is perfected, and only appears more liquid and humid, when the abdomen of the fœtus begins to be formed.

The chick in the egg is first nourished by the albumen; and when this is consumed, by the vitellus, as with milk. If we compare the chalazæ to the extremities of an axis, passing through the vitellus, which is of a spherical form, this sphere will be composed of two unequal portions, its axis not passing through its center; consequently, since it is heavier than the white, its smaller portion must always be uppermost, in all positions of the egg. See the article Chalaza.

The yellowish-white, round spot, called cicatricula, is placed on the middle of the smaller portion of the yolk, and therefore, from what has been said in the last paragraph, must always appear on the superior part of the vitellus. See the article Cicatricula.

Not long before the exclusion of the chick, the whole yolk is taken into its abdomen; and the shell, at the obtuse end of the egg, frequently appears cracked, some time before the exclusion of the chick. The chick is sometimes observed to perforate the shell with its beak. After exclusion, the yolk is gradually wasted, being conveyed into the small guts by a small duct. Aristotle says, that long eggs produce the female, and round the male kind: Scaliger seems to be of the same opinion. Pliny is of the opposite side, for he pretends, that the long eggs are for the males, and the round for the females: but these opinions are supported by no foundation, as the authors give neither good reason nor experiments to prove their respective assertions, and it is very likely that both the round and the long eggs may indifferently produce male and female.

Eggs differ very much according to the birds that lay them, according to their colour, form, bigness, age, and the different way of dressing them: those most used in food, are hens eggs: of these, such as are new laid are best. Galen says, that the best and wholesomest eggs are those of the hen and pheasant, but he disallows the use of those of the goose and the ostrich. Eggs should be moderately

rately done: some authors also require, that they should be very white and long. Eggs are nourishing and good food, they increase the seminal juices, qualify the sharp humours of the breast, are good for phthisical people, easily digest, ease the piles, and are looked upon to be good to make the voice loud and fine. When eggs are too old, they heat too much, produce bad juice, and are more especially noxious to those who are of a hot and bilious constitution: they contain much oil and salt, and agree at all times with any age and constitution, provided they are endued with the good qualities before-mentioned.

Aquapendente relates several ways how to know whether eggs are new laid or not; he would have them held to a candle, and then see whether the humours contained therein are clear, thin and transparent; for if they be otherwise, it is a sign the eggs are old, because the effervescence has embroiled and confounded the insensible parts of these humours, and made them dark. Lastly, hold an egg to the fire, and if a little watry moisture sticks to it, it is new; if not, it is old; because a new laid egg is moister than the old, and its humours being thinner, work easier through the pores of the shell.

As to the preservation of eggs, it is observed that the egg is always quite full when it is first laid by the hen, but from that time it gradually becomes less and less so, to its decay; and however compact and close its shell may appear, it is nevertheless perforated with a multitude of small holes, though too minute for the discernment of our eyes, the effect of which is a daily decrease of matter within the egg, from the time of its being laid; and the perspiration is much quicker in hot weather than in cold.

To preserve the egg fresh, there needs no more than to preserve it full, and stop its transpiration; the method of doing which, is, by stopping up those pores with matter which is not soluble in watry fluids; and on this principle it is, that all kinds of varnish, prepared with spirit of wine, will preserve eggs fresh for a long time, if they are carefully rubbed all over the shell: tallow, or mutton fat, is also good for this purpose, for such as are rubbed over with this will keep as long as those coated over with varnish.

It was antiently thought, that none but birds and fishes, with some other animals, were produced *ab ovo*, from the egg, but many of the moderns incline to think that all animals, even man himself, is generated that way. In the testes of women, are found little vesicles, about the size of green pease, which are accounted eggs; for which reason, these parts which the antients called testicles, the moderns call ovaries: these eggs, fecundated by the volatile and spirituous part of the seed of the male, are detached from the ovary, and fall down the fallopian tubes into the uterus, where they grow and increase. This system is countenanced by abundance of observations and experiments. See the article GENERATION.

Artificial method of hatching EGGS. See the article HATCHING.

Other eggs, improperly so called, are the white oblong bodies whereof insects are formed: such are the eggs of flies, gnats, butterflies, &c. which the antients called *vermiculi*. The female fly, after a congress with the male, is seldom so much as twenty-four hours before she begins to deposit her eggs upon some substance proper to give nourishment to the worms that are to be produced from them: these eggs in general are white and oblong. The gnat arranges her eggs in the form of a small boat; each separate egg is of the form of a ninepin; the thicker end of these are placed downwards, and are all firmly joined to one another by their middles.

EGG, in architecture, an ornament in that form, cut in the echinus, or quarter round of the ionic and composite capitals. The profile or contour of the echinus is enriched with eggs and anchors placed alternately.

EGRA, a city of Bohemia, situated on a river of the same name, about seventy-five miles west of Prague: east longitude 12° 22′, north latitude 50° 10′.

It is remarkable for its medicinal waters, esteemed good in hypochondriacal cases, and other diseases arising from infarctions of the bowels. They are gently cathartic, and afford a salt of the same mixture with our Epsom-salt, much used in Germany, and called from the name of the place Egranum Sal.

EGYPT, an extensive country of Africa, lying between 30° and 36° of east longitude, and between 21° and 31° of north latitude, and bounded by the Mediterranean on the north; by the Red-sea and

Iſthmus of Suez, which divide it from Arabia, on the eaſt; by Abyſſinia or Ethiopia, on the ſouth; and by the deſarts of Barca and Nubia, on the weſt; being ſix hundred miles in length from north to ſouth; and from one hundred to two hundred in breadth from eaſt to weſt. Egypt is ſubject to the grand ſignior, and governed by a baſhaw, or viceroy. It owes its fertility to the annual overflowing of the Nile, which it begins to do in the months of May and June, and is uſually at its height in September, from which time the waters decreaſe till May or June again. By this ſupply of water, Egypt is rendered ſo fruitful, as to ſerve Conſtantinople, and other places with corn, as it did Rome and Italy of old. They only harrow their grain into the mud, on the retiring of the water, and in March following, uſually have a plentiful harveſt; and the lands, not ſown, yield good crops of graſs for the uſe of the cattle. According to Mr. Sandys, no country in the world is better furniſhed with grain, fleſh, fiſh, ſugar, fruits, melons, roots, and other garden ſtuff, than the lower Egypt.

EGYPTIANS, or GYPSIES. See GYPSIES.

EJACULATION, in medicine, is the introduction of the male ſemen into the female matrix.

EJACULATOR, in anatomy, a name applied to two muſcles of the genitals, from their office in the ejaculation of the ſeed. The ejaculatories ariſe from the ſphincter of the anus, and advance along the urethra, as far as the middle thereof, where they are inſerted laterally.

The ſame denomination is likewiſe given to two muſcles of the clitoris, which, ariſing from the ſphincter ani, advance laterally along the labia, and are inſerted aſide of the clitoris.

EJACULATORIA, or EJACULANTIA *Vaſa*, in anatomy, are the veſſels which receive the ſeminal matter elaborated in the teſtes, and convey it to the penis: theſe are the epididymis, the vaſa deferentia, the veſiculæ ſeminales, and the proſtatæ.

EJECTION, in the animal œconomy, evacuation, or the diſcharging any thing through ſome of the emunctories, as by ſtool, vomit, *&c.*

EJECTIONE CUSTODIÆ, in law, a writ that lies againſt a perſon who caſts out the guardian from any land during the minority of the heir.

The writ *raviſhment de gard* is of the like nature with this; as is alſo *droit de gard*.

EJECTIONE *firmæ*, in law, is a writ which lies for the leſſee for a term of years, who is ejected, either by the leſſor or a ſtranger, before his term is expired. See the article EJECTMENT.

EJECTMENT, *ejectione firmæ*, in law, a writ, or action, which lies for the leſſee for years, on his being ejected, or put out of his land before the expiration of his term, either by the leſſor, or a ſtranger. It may alſo be brought by the leſſor againſt the leſſee, for rent in arrears; or holding over his term, *&c.* Ejectment of late years is become an action in the place of many real actions, as writs of right, formedons, *&c.* which are very difficult, as well as tedious and expenſive; and this is now the common action for trial of titles, and recovering of lands, *&c.* illegally held from the right owner, yet where entry is taken away by diſcents, fines, recoveries, deſſeiſins, *&c.* an ejectment ſhall not be brought; whereby, we find, that all titles cannot be tried by this action.

The method of proceeding in the action of ejectment is to draw a declaration, and feign therein a leaſe for three, five, or ſeven years, to him that would try the title; and alſo feign a caſual ejector, or defendant, and then deliver the declaration to the ejector, who ſerves a copy of it on the tenant in poſſeſſion, and gives notice, at the bottom, for him to appear and defend his title; or that he the feigned defendant will ſuffer judgment by default, whereby the true tenant will be turned out of poſſeſſion: to this declaration the tenant is to appear, the beginning of next term, by his attorney, and conſent to a rule to be made defendant, inſtead of the caſual ejector, and take upon him the defence, in which he muſt confeſs leaſe, judgment, entry, and ouſter, and at the trial ſtand upon the title only: but in caſe the tenant in poſſeſſion does not appear, and enter into the ſaid rule in time, after the declaration ſerved then, on affidavit being made of the ſervice of the declaration, with the notice to appear as aforeſaid, the court will order judgment to be entered againſt the caſual ejector by default, and thereupon the tenant in poſſeſſion, by writ *habere facias poſſeſſionem*, is turned out of his poſſeſſion. On the trial in ejectment, the plaintiff's title is to be ſet forth from the perſon laſt ſeiſed in fee of the lands in queſtion, under whom the leſſor claims down to the plaintiff, proving the deeds, *&c.* and

and the plaintiff ſhall recover only according to the right which he has at the time of bringing his action. And here, another who hath title to the land, upon a motion made for that purpoſe, may be defendant in the action with the tenant in poſſeſſion, to defend his title; for the poſſeſſion of the lands is primarily in queſtion, and to be recovered, which concerns the tenant, and the title thereto is tried collaterally, which may concern ſome other.

EIGHT, or PIECE OF EIGHT. See COIN.

EIGHT pair of the nerves. See NERVE.

EIMBECK, a town of lower Saxony, belonging to the elector of Hanover, twenty-five miles ſouth of Hildeſheim.

EISLEBEN, a town of Upper Saxony, five miles eaſt of Mansfield, remarkable for being the birth-place of Luther.

ELABORATION, the art of finiſhing, or perfecting, any thing, with labour and time.

The term is chiefly uſed, in medicine, where the chyle, blood, and ſemen are ſaid to be well elaborated, when they are well conditioned, have undergone all the ſecretions, mixtions, impregnations, and circulations neceſſary to bring them to perfection.

ELABORATORY, the ſame with laboratory. See the article LABORATORY.

ELÆAGNUS, DUTCH MYRTLE, in botany, a genus of trees, belonging to the tetrandria-monogynia claſs of Linnæus, the characters of which are, that it has no flower-petals; the fruit is an oval, obtuſe, and ſmooth drupe, including an oblong kernel or nut.

As to the medicinal virtues of its leaves, which are the only parts in uſe, they are reputed drying, diſcutient, and good againſt worms.

ELÆOCARPUS, in botany, a genus of the polyandria monogynia claſs of plants, the calyx of which is a five-leafed perianthium: the corolla conſiſts of five jagged torn petals, of the length of the cup: the fruit is a roundiſh drupe; and the ſeed a criſp ſpherical nucleus.

ELÆOSACCHARUM, in pharmacy, a preparation of ſome eſſential oil with ſugar, thus performed: grind an ounce of dry loaf-ſugar to an impalpable powder, in a glaſs mortar, and with a glaſs-peſtle, and by degrees add thereto a dram of any eſſential oil, or only half a dram, if the oil be very tenacious; and continue rubbing them together, till all the oil be thoroughly mixed, and drank in by the ſugar. If a little freſh white of an egg be added in the grinding, the oil becomes thereby more eaſily miſcible; but the mixture will not keep ſo long, without turning rancid.

If theſe elæoſaccharums be well prepared, dried, and put into clean glaſſes, exactly cloſed with glaſs ſtopples, they may be preſerved a long time perfect. By this method, therefore, you may prepare an excellent medicine, rich in virtues: for if the elæoſaccharum of mint be diſſolved in diſtilled mint-water, then ſtrengthened with the addition of ſpirit of mint, and the mixture ſweetened with the ſyrup of the ſame plant, the whole virtues of mint may be thus obtained.

ELÆOTHESIUM, ελαιοθεσιον, in antiquity, the appointing-room, or place where thoſe who were to wreſtle, or had bathed, anointed themſelves. See GYMNASIUM.

ELAPHEBOLIUM, ελαφηβολιων, in grecian antiquity, the ninth month of the athenian year, anſwering to the latter part of February and beginning of March. It conſiſted of thirty days, and took its name from the feſtival elaphebolia, kept in this month, in honour of Diana the huntreſs; on which occaſion, a cake made in the form of a deer, was offered to her.

ELASMIS, in natural-hiſtory, a genus of talcs, compoſed of ſmall plates in form of ſpangles, and either ſingle, and not farther fiſſile, or, if complex, only fiſſile to a certain degree, and that in ſomewhat thick laminæ. See the article TALC.

Of theſe talcs there are ſeveral varieties, ſome with large and others with ſmall ſpangles, which differ alſo in colour, and other peculiarities.

ELASTIC, in natural philoſophy, an appellation given to all bodies endowed with the property of elaſticity. See the next article.

ELASTICITY, or ELASTIC FORCE, that property of bodies wherewith they reſtore themſelves to their former figure, after any external preſſure; being the ſame with what is otherwiſe called ſpringineſs, very obſervable in a bent bow, ſteel ſprings, and the like.

A perfectly elaſtic body, is that which reſtores itſelf with the ſame force wherewith it was bent, or depreſſed; thoſe which do not ſo reſtore themſelves with exactly the ſame force, being called imperfectly elaſtic bodies.

Philoſophers account for elaſticity from the principles of corpuſcular attraction and repulſion: thus, if a ſteel ſpring, wire,

wire, or piece of very thin glafs, be bent out of its natural pofition, the particles on the convex part are forced from the intimate union they had before; and, on the concave part, they are forced nearer together, or harder upon each other, than in the natural ftate: in both which cafes, there will be a confiderable refiftance to overcome, and confequently require a fuperior force. During this ftate of the particles, they may be faid to be under a fort of tenfion on one fide, and compreffion on the other; and fince by this force they are not drawn out of each others attraction, as foon as the force is remitted or ceafes to act, the attractive power reduces the particles, and unbends the wire. Now it is well known, that many fubftances are compofed of fuch fibrous parts or filaments which refemble fine wires, and are interwoven and difpofed in fuch a manner, as in fponge, for inftance, that they cannot be compreffed without being bent or wrefted from their natural pofition; whence all fuch bodies will, in fuch cafes, exert a fpring or force to reftore themfelves, in the fame manner that the bent wire did.

All bodies that we know of, are in fome degree or other elaftic, but none of them perfectly fo; fuch are moft metals, femi-metals, ftones, and animal and vegetable fubftances, however they may differ in degree. Elafticity feems to vary, according to the different denfities of bodies; for the more metals are hammered, the more elaftic they become; and the elafticity of the hardeft tempered fteel to that which is foft, may be found to be as 7809 to 7738.

We may confider all elaftic bodies to be made up of fuch ftrings or fibres as A B (plate LXXXV. fig. 2. n° 1.) or rather of elaftic ftrata parallel to each other, reprefented by A B, in the ball D C. If this ball be ftruck at D by a hard or elaftic body, all the ftrata will be bent in towards C, as expreffed by the dotted lines, whilft the ball is flattened or dented at D. But the ftrata quickly reftoring themfelves, the furface of the ball re-affumes its firft figure, and that more or lefs exactly, according as the elafticity is more or lefs perfect.

The great law of perfectly elaftic bodies, is, that their relative velocity will remain the fame before and after collifion; that is, perfectly elaftic bodies will recede from one another after the ftroke, with the fame velocity that they came together. Many curious phænomena may be explained from this property in bodies.

If the ivory ball A, (*ibid.* n°. 2.) weighing two ounces, ftrike with the velocity 16 againft B at reft, weighing alfo two ounces, the body B will move forward after the ftroke with the velocity 16, A remaining at reft in its place. The reafon of this is, that the body A lofes one half of its motion by ftriking the equal body B, and the other half by the elafticity of B, recovering its former figure. From this experiment, feveral pretty odd phænomena arife: thus, if a row of fhovel-board pieces (that is, metalline cylinders of about half an inch in height, and two inches diameter) be laid upon a fmooth table, and you take a fingle piece, and drive it againft the row, the laft piece of the row will fly off; for if A (*ibid.* n° 3.) ftrike the row of pieces B, C, D, E, F, G, H, I, in the direction A *a*, then will the laft piece I fly off to *i* with the fame velocity that A ftruck B; and whatever be the velocity of A, no other piece but the laft piece I will fly off. But if you take two pieces, as A and B, (*ibid*, n° 4.) and ftrike them together againft the row C, D, E, F, G, H, I, the two laft pieces, H and I, will fly off from the other end of the row with the fame velocity that A and B made the ftroke.

If three or more pieces are made ufe of to make the ftroke, the very fame number will fly off from the other end of the row; and, it is to be obferved, that the fame will happen with equal elaftic balls, fufpended in a row by ftrings of the fame length.

Again, if the elaftic body A, (*ibid.* n° 5.) weighing four ounces, ftrike the quiefcent body B, weighing only two ounces, with a velocity equal to 12; then will the velocity of A, after the ftroke, be 4, and that of B 16. Juft the reverfe of this happens, when a leffer body ftrikes againft the greater; in which cafe, the ftriking or leffer body will be reflected with one fourth of its firft motion, and the greater be carried forward with a motion which is as 16.

The magnitude and motions of fpherical bodies perfectly elaftic, and moving in the fame right line, and meeting each other, being given, their motion after reflection may be determined thus: let the bodies be called A and B, and the refpective velocities *a* and *b*; then, if the bodies tend

tend the same way, and A, moving swifter than B, follows it, the velocity of the body A, after the reflection, will be $\frac{aA - aB + 2bB}{A + B}$, and that of the body $B = \frac{2aA - bA + bB}{A + B}$; but if the bodies meet, then, changing the sine of b, the velocity of A will be $\frac{aA - aB - 2bB}{A + B}$, and that of $B = \frac{2aA + bA - bB}{A + B}$: and if either of these happen to come out negative, the motion after the stroke tends the contrary way to that of A before it; which is also to be understood of the motion of the body A, in the first case.

For the elasticity of the air, see the article AIR.

ELATE, in botany, a genus of plants, the characters of which are not perfectly ascertained; the male and female flowers are in the same spadix; the calyx of the male flower is a bivalve spatha: the corolla consists of three roundish petals, and the stamina are three simple filaments; the calyx and corolla of the female flowers are the same as in the male, the germen is roundish, the fruit is an oval acuminated drupe, and the seed an oval furrowed nut. This is also the name of some botanists for the phœnix. See the article PHOENIX.

ELATER, in zoology, a genus of four winged flies, of the order of the coleoptera; the body of which is oblong, and the antennæ setaceous: add to this, that the creature, when laid on its back, leaps with great agility.

There are a great many species of elater, distinguished by their different colours, as red, brown, green, blue, and black; which, in some species, are variously blended together.

ELATERIUM, in botany, a name by which Boerhaave calls the momordica of other botanists. See MOMORDICA.

Elaterium, in pharmacy, imports, in general, any purging medicine; but is particularly applied to those which operate with violence. Hence the word was transferred to the wild cucumber, or momordica, and the preparations thereof. See the article MOMORDICA.

In the writings of Hippocrates, elaterium is frequently mentioned as an external application, of a digestive and detergent nature.

ELATINE, FLUELLIN, in botany, a genus of the octandria-tetragynia class of plants, the corolla of which consists of four ovated, obtuse, sessile, patent petals: the fruit is an orbiculated great capsule, compressed globeways, containing four cells, and consisting of four valves: the seeds are numerous, lunulated, erect, and surrounding the receptacle in the manner of a wheel. This plant is an aperient, resolvent, and vulnerary.

This is also used by Dillenius for antirrhinum, or snapdragon. See the article SNAPDRAGON.

ELBE, a large river in Germany, which, rising on the confines of Silesia, runs through Bohemia, Saxony, and Brandenburg; and afterwards dividing the dutchy of Lunenburg from that of Mecklenburg, as also the dutchy of Bremen from Holstein, it falls into the german ocean, about seventy miles below Hamburgh.

It is navigable for great ships higher than any river in Europe.

ELBOW, in anatomy, the juncture of the cubitus and radius; or the outer angle made by the flexure or bend of the arm. See CUBITUS and RADIUS.

ELBOW, in architecture, a term used for an obtuse angle of a wall, building, road, &c. which divides it from its right line.

ELCESAITES, in church-history, antient heretics, who made their appearance in the reign of the emperor Trajan, and took their name from their leader Elcesai. The elcesaites kept a mean between the jews, christians, and pagans; they worshiped but one God, observed the jewish sabbath, circumcision, and the other ceremonies of the law. They rejected the pentateuch, and the prophets; nor had they more respect for the writings of the apostles, particularly those of St. Paul. They detested chastity and continence, and obliged their disciples to marry. They acknowledged a messiah, whom they called their great king; but we do not know whether they meant Jesus Christ, or some pretended messiah. They gave him a human form, but invisible, the dimensions of which were thirty-eight leagues in height, and so in proportion. They pretended that the Holy Ghost was a woman, and of the same size with the messiah. They were much addicted to judicial astrology, magic, and enchantments. They held that it is lawful to renounce the faith with the lips, provided a man kept it in his heart.

ELDER, or SENIORS, in jewish history, were

were perfons the moft confiderable for age, experience, and wifdom. Of this fort were the feventy men whom Mofes affociated to himfelf in the government of his people; fuch, likewife, afterwards were thofe who held the firft rank in the fynagogue, as prefidents.

In the firft affemblies of the primitive chriftians, thofe who held the firft place, were called elders. The word prefbyter, often ufed in the New Teftament, is of the fame fignification: hence the firft councils of chriftians were called prefbyteria, or councils of elders.

ELDER is alfo a denomination ftill preferved in the prefbyterian difcipline. See the article PRESBYTERIANS.

They are officers who, with the minifters and deacons, compofe the feffions of the kirk. The elder's bufinefs is to affift the minifter in vifiting the congregation upon occafion, to watch over the morals of the people of his diftrict, and to give them private reproof in cafe of any diforder; but if the fcandal be grofs, or the perfon obftinate, he lays the thing before the feffion. The elders are chofen from among the moft fubftantial, knowing, and regular people, by the feffion or confiftory of the kirk. There is a ruling elder in every feffion: he fhould be a man of fpotlefs character, and of principal confideration and intereft in his parifh: he is chofen out of the kirk feffion: the congregation is to approve of the choice: the minifter ordains him before the congregation: he may be chofen to affift in any church judicatory, and in all manner of government and difcipline, has an equal vote with the minifter.

ELDER TREE, *fambucus*, in botany. See the article SAMBUCUS.

ELDER, or ALDER, *alnus*, in botany. See the articles ALDER and ALNUS.

ELECAMPANE, *helenium*, is ranked by botanifts among the ftar-worts. See the article ASTER.

The virtues of elecampane are much cried up, as a ftomachic, alexipharmic, and fudorific; and therefore prefcribed in crudities of the ftomach, the cough, afthma, plague, and other contagious difeafes. Externally, it is recommended againft the itch, convulfions, and rheumatifm.

ELECT, *electi*, among ecclefiaftical writers, thofe whom God has chofen, or predeftinated to be faved. See the article PREDESTINATION.

ELECT, in matters of polity, is applied to archbifhops, and other ecclefiaftic officers, who are chofen, but not yet confecrated; as alfo to fecular officers before they are invefted with their office or jurifdiction: thus the emperor is faid to be elect, before he is inaugurated; and the lord mayor of London before his predeceffor's mayoralty is expired.

ELECTARY, the fame with electuary. See the article ELECTUARY.

ELECTION, the choice that is made of a perfon, or thing, in preference of any other; as in the election of an emperor, of a pope, of a bifhop, of members of parliament, &c. See EMPEROR, CONCLAVE, BISHOP, and PARLIAMENT.

ELECTION is alfo the ftate of a perfon who is left to his own free will, to take or do one thing or another, which he pleafes. If a perfon makes a leafe of land rendering fo much money in rent, or a quarter of corn, &c. the leffee fhall have his election which he will render, as being the firft agent, by payment of the one, or delivery of the other. Where nothing paffes to a grantee before election, to have one thing or the other, and no time is appointed, the election ought to be made during the life of the parties, and not afterwards: but where an eftate conveys immediately to the grantee, or donee, &c. in that cafe, election may be made by them, or their heirs and executors. And when a donee, or grantee, has his election in what manner he will take the thing granted, there the title or intereft paffes immediately, and the party and his heirs, &c. are at liberty to make the election when they will.

ELECTION *of a clerk of ftatutes-merchant*, is the writ that lies for the choice of a clerk, to take bonds, called ftatutes-merchant; and iffues out of the court of chancery, upon fuggeftion that the clerk formerly affigned is gone to dwell in another place, or is under fome impediment to attend the duty of his office.

ELECTION *of ecclefiaftical perfons*. There is to be a free election for the dignities of the church, in which no perfon fhall give any difturbance, on pain of forfeiture. Where any perfon that has a vote in fuch elections takes any reward for an election in any church, college, fchool, &c. the election fhall be void.

ELECTION *of a verderer of the foreft*, a writ which lies for the choice of a verderer, on the death or removal of any fuch officer of the foreft. It is directed to the fheriff, and the verderer is to be elected

elected by the freeholders of the county.

ELECTION, in theology, signifies the choice which God, of his good pleasure, makes of angels and men for the objects of his grace and mercy. See REPROBATION, and PREDESTINATION.

ELECTION is also used, by some medical writers, as a part of pharmacy, which consists in a knowledge of the various simples which compose the materia medica, and directs the choice of drugs.

ELECTION, in numbers, is, with regard to combinations, the different ways of taking any number of quantities given: thus, the quantities *a b c* may be taken different ways, as *a b c*, or *a b*, *a c*, and *a*, *b*, *c*.

ELECTIVE, something that is determined by election. See the preceding article.

The empire of Germany is elective, as is the kingdom of Poland; and among us, the magistrates of cities, and other corporate towns, members of parliament, *&c.* are elective.

ELECTOR, a person who has a right to elect or choose another to an office, honour, *&c.*

Elector is particularly, and by way of eminence, applied to those princes of Germany in whom lies the right of electing the emperor: being all sovereign princes, and the principal members of the empire. The electoral college, consisting of all the electors of the empire, is the most illustrious and august body in Europe. Bellarmine and Baronius attribute the institution of it to pope Gregory V. and the emperor Otho III. in the tenth century; of which opinion are the generality of historians, and particularly the canonists: however, the number of electors was unsettled, at least, till the thirteenth century. In 1356 Charles IV. by the golden bull, fixed the number of electors to seven; three ecclesiastics, *viz.* the archbishops of Mentz, Treves, and Cologne; and four seculars, *viz.* the king of Bohemia, count Palatine of the Rhine, duke of Saxony, and marquis of Brandenburg. In 1648 this order was changed, the duke of Bavaria being put in the place of the count Palatine, who having accepted the crown of Bohemia, was outlawed by the emperor; but being, at length, restored, an eighth electorate was erected for the duke of Bavaria. In 1692, a ninth electorate was created, by the emperor Leopold, in favour of the duke of Hanover, of the house of Brunswic Lunenburg.

There is this difference between the secular and ecclesiastic electors, that the first have an active and passive voice, that is, may choose and be chosen; the last, an active only. The three archbishops are to be thirty years old, before they can be advanced to the dignity; the seculars, eighteen, before they can perform the office themselves. These last have each their vicars, who officiate in their absence.

Besides the power of choosing an emperor, the electors have also that of capitulating with, and deposing him; so that, if there be one suffrage wanting, a protest may be entered against the proceedings. By the right of capitulation, they attribute to themselves great privileges, as making of war, coining, and taking care of the public interest and security of the states; and the emperor promises, upon oath, to receive the empire upon these conditions.

The electors have precedence of all other princes of the empire, even of cardinals and kings; and are addressed under the title of electoral highness.

Their several functions are as follow: the elector of Mentz is chancellor of Germany, convokes the states, and gives his vote before any of the rest. The elector of Cologne is grand chancellor of Italy, and consecrates the emperor. The elector of Treves is chancellor of the Gauls, and confers imposition of hands upon the emperor. The count Palatine of the Rhine is great treasurer of the empire, and presents the emperor with a globe at his coronation. The elector of Bavaria is great master of the imperial palace, and carries the golden apple. The marquis of Brandenburg is grand chamberlain, and puts the ring on the emperor's finger. The elector of Saxony is grand marshal, and gives the sword to the emperor. The king of Bohemia is grand butler, and puts Charlemaign's crown on the emperor's head. Lastly, the elector of Hanover, now king of Great Britain, is arch treasurer, though first erected under the title of standard-bearer of the empire.

ELECTORAL, in general, something belonging to electors. See ELECTOR.

ELECTORAL CROWN, or CORONET. See the article CROWN.

ELECTORATE, a term used as well to signify the dignity of, as the territories belonging to, any of the electors of Germany: such are Bavaria, Saxony, *&c.* Contrary to the common usage of Germany, the electorate, or territories belonging to electors, is hereditary; passing entire to the eldest son.

ELECTRICITY, in phyſiology, that property of certain bodies, whereby, after being rubbed, excited, or heated in ſome particular degree, they acquire a power of attracting and repelling other remote bodies; and frequently of emitting ſparks and ſtreams of light.

The antients, having obſerved that amber, which they called *electrum*, upon being rubbed, attracts bits of ſtraw, down, and other light bodies, firſt gave this property the name of electricity, which they thought peculiar to amber and a few ſtones mentioned by Theophraſtus, Pliny, and ſome others. But the philoſophers of the laſt, and more particularly of the preſent age, have found that numbers of other bodies poſſeſs this quality; and made ſo many diſcoveries in electricity, that there is ſcarce any other ſubject in natural philoſophy that has given occaſion to more experiments.

This quality is of two ſorts, *viz.* vitreous electricity, or that which belongs to glaſs; and reſinous electricity, or that which belongs to amber, roſin, wax, gum, and ſuch like ſubſtances.

The bodies ſuſceptible of electricity, are alſo divided into two claſſes; the one are electrical of themſelves, or *electrica per ſe*; that is, they contain that quality in themſelves, and need only be rubbed, &c. to excite it: the others do not contain that virtue in themſelves, or they have ſo little of it, as to be reckoned to have none at all; yet they acquire it by communication, or by emanation derived to them by a body that is electrical *per ſe*: thoſe bodies are ſimply called non-electrics, or *non electrica per ſe*.

The electrics *per ſe*, or, as they are otherwiſe called, the originally electrics, are, according to Muſchenbroek, all ſorts of gems, ſeveral ſtones, all chryſtals and reſinous ſubſtances, ſulphur, red arſenic, ſalts, alum; all ſorts of glaſs, porcellane, dried vegetables; all woods, ropes, threads of lint, paper, the leaves of trees, the harder reſins, pitch, cotton; parts of animals, as their feathers, hair, horns, bones, ivory, whale-bone, the hide, parchment, the ſhells of fiſhes, ſilk, ſtrings made of dried guts, gum, ſealing-wax, feathered or hairy living animals, as cats, dogs, cocks, &c.

The non-electrics are ſeveral naked animals, or ſuch as are covered with neither hair nor feathers; metals, ſemi-metals, earths and duſt, which, by reaſon of its minuteneſs, won't bear to be rubbed ſeparately; all watry gums, opium, galbanum, ammoniac, aſſa fœtida, camphor; all ſorts of bodies that liquify with a ſmall heat, all moiſt bodies, all fluids which will not bear rubbing, &c.

Electricity, according to the ſame author, conſiſts in ſubtile exhalations, which in exciting the electrical body, are put into motion; and which, by flying to and from it, agitate all thoſe light bodies that fall within the ſphere of their attraction.

That theſe exhalations, or ſubtile effluvia, conſtitute electricity, appears from hence, 1. From the touch, as theſe bodies are perceived to be ſurrounded with a moſt ſubtile atmoſphere, or covered with a gentle blaſt of wind, that continues to breath every where around them. 2. From that offenſive ſmell, which reſembles phoſphorus, the phlegm of aqua regia, or the ſpirit of vitriol. 3. Being taken into the mouth, they yield an acid and aſtringent taſte. 4. They ſeem to adhere to the extremities of the bodies which they ſurround, and from which they recede, in the form of ſparks, and of a ſubtile lucid flame. 5. This flame is ſometimes attended with an exploſion, that may be heard at the diſtance of two hundred paces: beſides, the greater flames occaſion a continued hiſſing, or crackling noiſe in the air. Since, therefore, the electrical effluvia affect all the human ſenſes, we can no longer doubt of their being a corporeal fluid.

Mr. Watſon thinks, that electricity is not furniſhed from the electric bodies employed in the experiments, nor from the circumambient air; but that it is the effect of a very ſubtile and elaſtic fluid occupying all bodies, in contact with the terraqueous globe; that every where, in its natural ſtate, it is of the ſame degree of denſity; that glaſs and other bodies, which are electrics *per ſe*, have the power of taking this fluid from one body and conveying it to another, in a quantity ſufficient to be obvious to all our ſenſes; that, under certain circumſtances, it is poſſible to render the electricity in ſome bodies more rare than it naturally is, that, by communicating this to other bodies, to give them an additional quantity, and make their electricity more denſe; and that theſe bodies will thus continue, until their natural quantity is reſtored to each; that is, by thoſe which have loſt part of theirs, acquiring what they have loſt, and by thoſe to whom more has been communicated, parting with their additional quantity. Both one and the

ether of these is, from the elasticity of the electric matter, attempted to be done from the nearest non-electric; and when the air is moist, this is soon accomplished by the circumambient vapours, which here may be considered as preventing, in a very great degree, our attempts to insulate non-electric bodies.

In order to illustrate the phænomena of electricity, we shall give some select experiments.

1. Get a glass tube A B, of about three feet and a half in length, an inch and a half in diameter, and its sides a line thick: rub it with a piece of stuff, paper, or, which is still better, with the hand, provided it be very dry: you will succeed better if your hands be rubbed with chalk, or white lead. Afterwards bring this rubbed tube near any light bodies, as gold-leaf laid upon a glass stand C D; then will the gold-leaf be attracted and repelled in the manner represented in plate LXXXVI. n° 1.

If you do this in such a manner, that the gold-leaf, for example, be perpendicularly repelled above the tube, and that it meet with no other body, it will sustain itself in the air, always at the same distance from the tube, and may be conveyed in this situation quite round the room; but if it touch any other body, it will come back and adhere to the tube, and then it will be repelled anew as at the first.

2. Again, if the tube be rubbed anew, pretty briskly, it will attract a feather, or other light body, at a considerable distance; and after they have stuck to it for some time, they are again driven off, and it will constantly repel them, till they are touched by some other non-electrical body, as a finger or stick: on which they will be again attracted by the tube; and if the finger be held pretty near the tube, the feather will alternately fly from the tube to the finger, and back again; always stretching out its fibres the way that it is going, and that before it comes off from the finger or tube. See plate LXXXVI. n° 2.

Before we proceed to more complicated experiments, it will be proper to observe, that, in order to know that non-electrics have received the communicated electricity, they must be insulated: that is, they must not be suspended from, nor supported by any body, but what is an electric *per se*. For if one non-electric be touched by another, and this by a third, *&c.* all the electricity received by the first will go to the second, and from this to the third, *&c.* till at last it be lost upon the ground. But, if several non-electric bodies, touching one another, are at length terminated by electric bodies, in that respect they make but one body, and receive and retain electricity for some time. From hence it may be observed, that non-electrics are conductors of electricity. Water conducts it very well, but metals are the most convenient conductors.

3. Let an iron-rod, pointed at one end, be suspended on silk lines, and by means of a glass or rosin-sphere (which can be more regularly and constantly excited than a tube) be electrified, it will be found to have all the properties of the excited tube already mentioned; that end of the iron-rod, suspended as already mentioned, which is next the sphere, must point to it at the distance of a quarter of an inch. This apparatus being disposed, as represented, *ibid.* n° 3. the globe will be electrified in whirling round against a leather cushion rubbed with whiting, or dry a hand-rubbed in the same manner. When the rod, by this means, is strongly electrified, a stream of light, in diverging rays, will be seen to issue from that point of it which is most distant from the sphere; and if any non-electric body, as a finger, be placed within a quarter of an inch of the said flame, it will perceive a gentle blast of wind from the end of the iron; that is, the electrical fire will issue out from the point in such a manner, as to blow against the finger very sensibly; and if the finger be still held nearer, the large pencil of rays will be condensed in such a manner, as to run out from the point upon the finger, in a stream or body of dense, yellow fire, and strike the finger like a gentle *jet d'eau*. The rod suspended before the glass-sphere, is properly termed the prime conductor in this machine.

4. While the flame continues to appear from the end of the iron-rod, the finger being placed any where upon it, the flame at the end disappears immediately; and when the finger is taken off, it again instantly appears; and so by putting the finger off and on successively, the electric flame will appear and disappear alternately. These eruptions of the electrical fire will snap very sensibly, both to the eye and the ear, upon any part of the rod that the finger is pointed to. See plate LXXXVI. n° 3.

5. If a chain, or hempen cord, be suspended by silken strings all round the room, of any length you please, and one end thereof be hung, by a loop, across the rod, the electrical fire will instantly be transmitted through the whole length of the chain, and appear upon every part at the approach of the finger, and be heard to snap and strike with as great force as from the rod itself.

6. Take two plates of metal, very clean and dry, whose surfaces are nearly equal; hang one of them horizontally to the electrified rod, and bring under it, upon the other, any thin light body, as silver leaf, &c. When the upper plate is made electrical, the silver will be attracted by it; and if the under plate is held at a proper distance, will be perfectly suspended at right angles to the plates, without touching either of them; but if they are either brought nearer together, or carried farther asunder, the leaf will cease to be suspended, and will jump up and down between them.

The same effect will be produced, if the experiment is reversed by electrifying the bottom plate, and suspending the other over it.

7. The following improvement, upon the electrical machine of the abbe Nollet, already exhibited, was made by Mr. Watson in 1746. In the periphery of his machine, see plate LXXXVI. n° 4. were cut four grooves, corresponding with four globes, which were disposed vertically: one, two, or the whole number of these globes might be used at pleasure. They were mounted upon spindles, and the leather-cushion with which they were rubbed, was stuffed with an elastic substance, as curled hair, and rubbed over with whiting. One of the globes was lined to a considerable thickness with a mixture of wax and rosin, but no difference appeared in the power of this globe from the others.

For performing most of the following experiments, some have imagined a gun-barrel absolutely necessary, as the prime conductor; but Mr. Watson says, that a solid piece of metal, of any form, is equally useful; having observed the stroke from a sword, as violent as that from a gun-barrel.

If, to the suspended barrel, a spunge, thoroughly dry, be hung, it gives no appearance of fire, which shews it to be an electric substance; but if when the spunge has been immersed in water, it be suspended to the barrel, and the finger applied near it, the fire issues out with considerable force and snappings; and the drops, which, before the spunge was applied, fell very slowly, will now fall as fast: if the room be darkened, these drops will appear to be drops of fire, and illuminate the bason into which they fall.

8. If a phial of water is suspended to the prime conductor by a wire, let down a few inches into the water through the cork; and some metallic fringes, inserted into the barrel, touch the globe in motion, the electrical power may be so accumulated in the phial, that a man grasping it with one hand, and touching the gun-barrel with a finger of the other, will receive a violent shock through both his arms, especially at his elbows and wrists, and across his breast.

The commotion arising from the discharge of accumulated electricity in a phial, may be felt by a great number of men at once. M. le Monnier, at Paris, is said to have communicated this shock through a line of men, and other non-electrics, measuring nine hundred toises, being more than an english mile; and the abbe Nollet made the experiment upon two hundred persons ranged in two parallel lines.

9. If the electrical machine, and the man who turns the wheel thereof, be mounted on electrical cakes, the electrical power is so far from being increased, that, on the contrary, it is so much diminished, as to be oftentimes not at all perceptible.

10. A person standing on a cake of rosin, holding a chain fastened to the prime conductor, will be electrized; that is, he will be all over possessed with electric virtue; and, at the same time, feel nothing of it, unless some person standing by put his finger near to any part, and then the virtue will be emitted in form of fire, and snap and become very sensible to both the parties. See plate LXXXVII. fig. 1.

11. A person standing on rosin, holding the chain of the conductor, points his finger to the warm spirits of wine; and by communicating the electric fire thereto, kindles the rising vapour, and so sets the whole on fire. In this manner any sort of matter, which, when warmed, will send forth an inflammable vapour, will be set on fire. See plate LXXXVII. fig. 2.

The electrical commotion, mentioned in experiment 8, arising from an accumulation of the electrical fire, has been made very

very fenfible quite crofs the river Thames, by the communication of no other medium than the water of that river, and fpirit of wine fired at that diftance.

By comparing the refpective velocities of electricity and found, that of electricity, in any diftance yet experienced, appears inftantaneous.

12. If the globe be exhaufted of all its air, and then whirled about, the electricity will be obferved to act wholly within the globe, where it will appear, in a darkened room, in form of a cloud or flame of reddifh or purple-coloured light, filling the whole capacity of the globe.

13. If a loadftone, armed with iron, be hung on to the gun-barrel by an iron-wire, the electric virtue will rufh out from every part, but more forcibly from the iron than from the ftone itfelf: for from the ftone, it feems to be emitted in a more lax manner, and diffufed in a fort of fteam, or fiery vapour; whereas from the iron, it iffues in a more impetuous, denfe, and penetrating fteam; by which we learn, that the two moft confiderable powers of nature, electricity and magnetifm, do not always interfere, or impede each other's actions.

14. The method of firing gunpowder by the electric flame, has fomething particular in it; as it does not require any inflammable vapour to be previoufly raifed. The powder may be fired thus: a fmall cartridge is filled with dry powder, hard rammed, fo as to bruife fome of the grains: two pointed wires are then thruft in, one at each end, the points approaching to each other in the middle of the cartridge, till within the diftance of half an inch: then the cartridge being placed in the circle, when four electrified glafs-jars are difcharged, the electric flame leaping from the point of one wire to the point of the other within the cartridge, among the powder, fires it, and the explofion of the powder is at the fame inftant with the crack of the electrical difcharge.

15. As to metals, Dr. Franklin tells us, that he has been able, by electricity, to give polarity to needles, and to reverfe it. A fhock from four large glafs-jars fent through a fine fewing needle, gives it polarity.

16. In confequence of Dr. Franklin's hypothefis, of being able, by a proper apparatus, to collect the electricity from the atmofphere during a thunder-ftorm, it has been found, that a pointed bar of iron, forty feet high, being placed upon an electric body; and a ftormy cloud having paffed over the place where the bar ftood, thofe, appointed to obferve it, attracted from it fparks of fire, perceiving the fame kind of commotions as in the common electrical experiments. The like effect followed when a bar of iron ninety-nine feet high was placed upon a cake of rofin two feet fquare, and two inches thick: thefe were the firft experiments made, but they have fince been fufficiently varied and verified, fo that it feems now certain. 1. That a bar of iron, pointed or not, is electrized during a ftorm. 2. That a vertical, or horizontal fituation, is equally fitting for thefe experiments. 3. That even wood is electrized. 4. That, by thefe means, a man may be fufficiently electrized to fet fire to fpirit of wine with his finger, and repeat almoft all the ufual experiments of electricity.

17. Dr. Franklin has contrived a very ingenious and eafy method of trying experiments of this kind, by means of an electrical kite, made of a large thin filk handkerchief, extended and faftened, at the four corners, to two flight ftrips of cedar, of fufficient length for this purpofe. This kite being accommodated with a tail, loop, and ftring, will rife in the air like thofe of paper. To the top of the upright ftick of the crofs, is to be fixed a very fharp-pointed wire, rifing a foot or more above the wood. To the end of the twine, next the hand, is to be tied a filk ribband; and, where the twine and filk join, a key may be faftened. The kite is to be raifed when a thunder-guft appears to be coming on; and as foon as the thunder clouds come over the kite, the pointed wire will draw the electric fire from them, and the kite, with all the twine, will be electrified; and the loofe filaments of the twine will ftand out every way, and be attracted by an approaching finger. When the rain has wet the kite and twine, fo that it cannot conduct the electric fire freely, it will ftream out plentifully from the key on the approach of a man's knuckle. At this key a phial may be charged; and from the electric fire, thus obtained, fpirits may be kindled, and all the other electrical experiments be performed, which are done by the help of a glafs-fphere or tube; and the famenefs of the electric matter with that of lightning, may

may thereby be completely demonſtrated. From this identity ſome have conceived hopes of depriving the clouds of all their thunder, and thereby rendering thunder-ſtorms harmleſs.

18. Mr. Stephen Gray, juſt before he died, hit upon an experiment which ſeemed to indicate, that the attractive power, which regulates the motions of the heavenly bodies, is of the electric kind. The experiment was thus: he fixed a large, round, iron-ball upon the middle of a large cake of roſin and wax; and exciting the virtue ſtrongly in the cake, a fine feather, ſuſpended by a thread, and held near the iron-ball, was carried round it, by the effluvia, in a circular manner, and performed ſeveral revolutions: it moved the ſame way with the planets, from weſt to eaſt, and its motion, like theirs, was not quite circular, but a little elliptical.

Theſe being moſt of the capital experiments hitherto exhibited in electricity, we ſhall conclude this article by mentioning ſome of the medicinal virtues lately attributed to this ſubject of philoſophy. It has been pretended, that odours will pervade electrified globes and tubes of glaſs; and that the medicinal effects of drugs might likewiſe be tranſmitted this way; as alſo, that, if perſons were to hold in their hands, or place under their naked feet, odoriferous or purging ſubſtances, and were then to be electrized, they would be ſenſible of the effects of theſe ſubſtances: but this ſeems now to be an impoſition on the credulity of the world, no ſuch effects having ever been perceived. However, it does not follow that medicinal advantages are not to be gained from electricity itſelf; ſo ſubtile and ſo elaſtic a fluid admitted in a large quantity into our bodies, as, from undoubted experience, it greatly heats the fleſh and quickens the pulſe, may more eſpecially, when aſſiſted with the expectation of ſucceſs in the patient, in particular caſes, be attended with advantages. In effect, we meet with ſome cures performed in paralytic caſes, by the force of electricity.

ELECTRUM, *amber*, in natural hiſtory. See the article AMBER.

ELECTUARY, in pharmacy, a form in which both officinal and extemporaneous medicines are frequently made.

It may be conſidered as a number of boluſes united together, but is made ſomewhat ſofter, by an addition of a due proportion of preſerves or ſyrups. When the conſiſtence is very ſoft, it is called, ſometimes, by the name of opiates. See the articles BOLUS and OPIATES.

The principal conſideration in preſcribing officinal electuaries is, that ſuch things only be put together, as will not, by any oppoſite qualities, deſtroy one another, or loſe their natural properties, by lying long in this manner; and likewiſe that the whole be of a conſiſtence that will hold ingredients of different gravities in equal mixture.

Extemporaneous electuaries differ principally from the officinal, in that the latter are confined to ſuch things as will for a long time keep together; whereas the former may be ventured on with materials which will not remain long without change, provided they agree in intention; as conſerves with the teſtaceous powders, preparations with ſteel, and the like, will continue together long enough for preſent uſe, but will not lie many days without fermenting and ſpoiling.

The ſtronger cathartics ought not to be truſted in this form, becauſe the manner of taking does not ſufficiently aſcertain the doſe. The moſt powerful alexipharmics alſo, which are commonly given in acute caſes, are not conveniently thus truſted, ſo that an electuary is hardly ever met with in a fever. The quantity of an extemporaneous electuary ſhould ſeldom exceed three ounces; and thereabout will an ounce and a half of conſerve, two drams of the common powders, with a ſufficient quantity of ſyrup, amount to; though cinnabar, and ſome of the heavier things, will not take up ſo much: and if this rule, as to quantity, be not obſerved by the preſcriber, but more be ordered, it is a common thing for the compounder to do it for him, by proportioning the materials ſuitable thereto, as by making up half or a third of what is directed.

ELEEMOSYNÆ and ELEEMOSYNARIUS. See ALMS and ALMONER.

ELEGANCE, or ELEGANCY, an ornament of politeneſs and agreeableneſs, ſhewn in any diſcourſe, with ſuch a choice of rich and happy expreſſions, as to riſe politely above the common manners, ſo as to ſtrike people of a delicate taſte, and diffuſe a reliſh which hits every body.

It is obſerved that elegance, though irregular, is preferable to regularity without elegance: that is, by being ſo ſcrupulous of grammatical conſtruction, we loſe

lofe certain licences wherein the elegance of language confifts.

ELEGANCE, in painting, a certain manner which embellifhes and heightens objećts, either as to their form, colour, or both, without deftroying or perverting the truth. It is not feen in the correćtnefs of the defign, as appears from Raphael, and the antique. It is moft fenfibly perceived in works otherwife carelefs and inaccurate, as in Corregio, where, notwithftanding all the defećts as to juftnefs of defign, there is an elegance even in the manner of the defign itfelf, as well as in the turn of the attitudes, *&c.*

ELEGIAC, in antient poetry, any thing belonging to elegy. See ELEGY.

Elegiac verfes are alternately hexameter and pentameter, as in the following verfes of Ovid. See the articles HEXAMETER and PENTAMETER.

Flebilis indignos, elegeia, folve capillos.
Ah nimis ex vero nunc tibi nomen erit.

Sometimes, though very rarely, the pentameter preceded the hexameter, as in the following verfes of Athenæus.

Ευδαιμων Χαριτων, και Μελανιππ☉ εφυ
Θειας αγιςηρες εφεμεριοις φιλοτητ☉.

Who was the inventor of elegiac poetry, is not known. Horace profeffes himfelf quite ighorant of it. The principal writers of elegiac verfe, among the Latins, were Propertius, Ovid, and Tibullus, the latter whereof Quintilian efteems the beft elegiac poet; but Pliny the younger gives the preference to the firft: the chief writers of elegy among the Greeks were Callimachus, Parthenius, and Euphorion.

ELEGIT, in law, a writ of execution, which lies for a perfon who has recovered debt or damages; or upon a recognizance in any court, againft a defendant that is not able to fatisfy the fame in his goods.

It is direćted to the fheriff, commanding him to make delivery of a moiety of the party's lands, and all his goods, beafts of the plough excepted; this is done by a jury, fummoned to enquire what land the defendant had at the time of the judgment obtained; and the creditor, by virtue thereof, fhall hold the faid moiety of land delivered to him, until his whole debt and damages are paid and fatisfied: and during that time he is tenant by elegit. This writ ought to be fued out within a year and a day after the judgment.

All other writs of execution may be good, though not returned, except it be an elegit; but that muft be returned when executed, becaufe an execution is taken upon it, and that the court may judge of the fufficiency thereof.

ELEGY, a mournful and plaintive kind of poem. See the article ELEGIAC.

As elegy, at its firft inftitution, was intended for tears, it expreffed no other fentiments, it breathed no other accents but thofe of forrow: with the negligence natural to afflićtion, it fought lefs to pleafe than to move; and aimed at exciting pity, not admiration. By degrees, however, elegy degenerated from its original intention, and was employed upon all forts of fubjećts, gay or fad, and efpecially upon love. Ovid's book Of Love, the poems of Tibullus and Propertius, notwithftanding they are termed elegies, are fometimes fo far from being fad, that they are fcarce ferious. The chief fubjećts then to which elegy owes its rife, is death and love: that elegy therefore ought to be efteemed the moft perfećt in its kind which has fomewhat of both at once; fuch, for inftance, where the poet bewails the death of fome youth or damfel falling a martyr to love.

ELEMENT, in phyfiology, a term ufed by philofophers to denote the original component parts of bodies, or thofe into which they are ultimately refolvable.

The elements or principles to which all bodies may be ultimately reduced, are thefe five: 1. Water, or phlegm, which, in the chemical analyfis of them, rifes firft in form of vapour. 2. Air, which efcapes unfeen in great quantities from all bodies, fo as to conftitute half the fubftance of fome of them. 3. Oil, which rifes after, and appears fwimming on the furface of the water. 4. Salt, which is either volatile, or rifes in the ftill, as that of animal fubftances; or fixed, as that of vegetables, which is obtained by reducing them to afhes, making a lixivium or lye of thefe, and afterwards evaporating the moifture; by which means the falt fhoots into cryftals. 5. Earth, or what is called the caput mortuum, being what remains of the afhes after the falt is extraćted. This is the laft element of all bodies, which can be no farther altered by any art whatfoever. See the articles WATER, AIR, *&c.*

Elements are conceived as the moft fimple, homogeneous parts, or corpufcles; of an affemblage and mixture whereof all the bodies we fee confift. Authors generally

rally talk wildly, and inconfiftently, of the elements; and confound them with the principles of things: yet there is a great deal of difference. And fince they find by experience, that every thing is not made indifferently out of another, as that ftones are not proper to be converted into flefh, nor will they ferve to nourifh it; fo they judge by analogy that all forts of bodies are not compounded of principles alone, in the moft fimple manner poffible; but only fome very fimple things, of the mixture of which all other things are afterwards compounded: thefe are what philofophers call elements, which differ from principles in this, that a principle, fuch as matter, is an incomplete and undetermined thing; whereas an element is complete and determined. See the article PRINCIPLE.

There muft, therefore, be more than one element, otherwife there would be but one uniform fimplicity in nature. But philofophers have not agreed what is meant by element, becaufe they have not fo much enquired into the nature of things, as into the fenfations which they are apt to raife in us. Thus, fome philofophers who confidered the fenfe of feeing only, have afferted that light and darknefs were the elements of things: and others, who referred every thing to feeling, have pretended, that hard and liquid, hot and cold, were the elements. Ariftotle may be placed amongft thefe laft, though he proceeded in a different manner; he firft confidered the principal qualities that come under the fenfe of feeling, as heat, cold, drinefs, or hardnefs, and humidity or liquidity. And, after he had obferved that two of thefe qualities might meet in the fame fubject, and that the four might be combined four different ways, he compofed four elements, cold and dry; cold and moift; hot and moift; and hot and dry.

Then, in order to give names to them, he examined what thofe things in nature were, in which one element feemed to prevail. Thus imagining the earth to be both the coldeft and drieft of all things, he called his firft element earth; fo likewife, becaufe he thought that water was the coldeft and moifteft thing, he called his fecond element water; farther, as he imagined, nothing more moift and hot than air, he called his third element air; and, laftly, not doubting but that fire is the hotteft and drieft thing in the world, he called his fourth element fire.

It is not to be fuppofed, that this earth which we inhabit, this water which we drink, this air which we breathe, and this fire which we kindle, are the four elements Ariftotle meant; for the name element is only given to the moft fimple body, whereas the four juft mentioned are the moft compounded of any we know.

The cartefians admit only three elements, the firft a materia fubtilis, or fine duft; the fecond, a coarfer, but round kind; and the third, a ftill more irregular and hooked kind of particles. See the article CARTESIANS, &c.

Our great Sir Ifaac Newton confiders the primary elements of bodies on the atomical fyftem, thus; all things confidered, it feems probable, that God, in the beginning, formed matter in folid, maffy, hard, impenetrable, moveable, particles, of fuch fizes and figures, and with fuch other properties, and in fuch proportion to fpace, as moft conduced to the end for which he formed them; and that thefe particles, being folid, are incomparably harder than any porous bodies compounded of them; even fo very hard, as never to wear or break in pieces, no ordinary power being able to divide what God himfelf made one in the firft creation. While the particles continue entire, they may compofe bodies of one and the fame nature and texture in all ages: but, fhould they wear away, or break in pieces, the nature of things depending on them would be changed. Water and earth compofed of old worn particles, and fragments of particles, would not be of the fame nature and texture, now, with water and earth compofed of entire particles in the beginning. And therefore, that nature may be lafting, the changes of corporeal things are to be placed only in the various feparations and new affociations and motions of thefe permanent particles; compound bodies being apt to break, not in the midft of folid particles, but where thofe particles are laid together, and only touch in a few points.

ELEMENT, in a figurative fenfe, is ufed for the principle and foundations of any art or fcience, as Euclid's Elements, &c.

ELEMI, or ELEMY, in the materia medica, a kind of refin, very improperly called gum-elemi. There are two forts of it kept in the fhops, the one genuine, and brought from Ethiopia; the other fpurious, and the produce of America. The true

Fig. 1. The ELEPHANT.

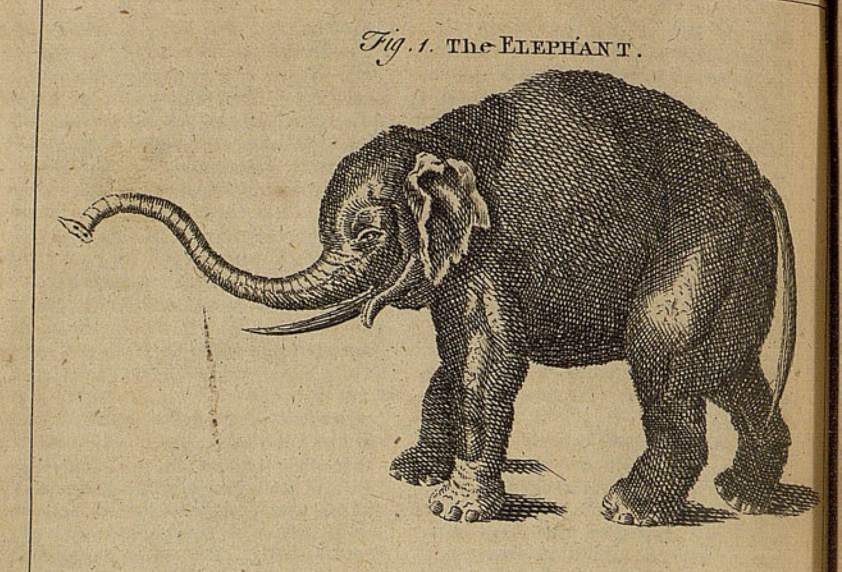


Fig. 2. The ELK.



Fig. 3. EPICYCLOID.

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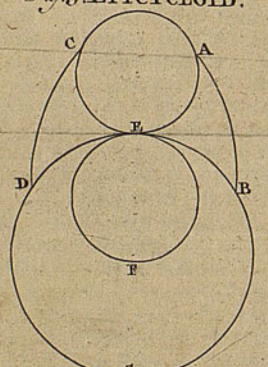


Fig. 4. ERMIN.



Fig. 5. ERMINE.



T. Jefferys sculp.

true kind is a yellowiſh reſin, with a caſt of green and white; its ſmell is acrid and pleaſant, and its taſte acrid and bitter. It is very inflammable, and readily diſſolves in oil, and other fat ſubſtances, over the fire; which two characters alone ſufficiently diſtinguiſh it from the gums: but this genuine elemi is very rare in Europe.

The ſpurious elemi is a whitiſh reſin, produced from a tall tree, with pinnated leaves, not unlike thoſe of the pear-tree. It is in ſome degree pellucid, and of a fragrant ſmell. It is only uſed externally, being greatly recommended for reſolving tumours, deterging ulcers, wounds, *&c.*

ELENCHUS, in logic, a ſophiſm, or fallacious argument, which deceives the hearer under the appearance of truth. See the article SOPHISM.

ELEOSACCHARUM, or ELÆOSACCHARUM. See ELÆOSACCHARUM.

ELEPHANT, *elephas*, in zoology, a genus of quadrupeds, of the order of the jumenta, the characters of which, according to Linnæus, are theſe: it has no fore-teeth; the upper canine, or dog-teeth, are conſiderably long; it has a very long flexible proboſcis or trunk, and two paps placed on the breaſt. See plate LXXXVIII. fig. 1.

The teeth of this animal is what we call ivory. See the article IVORY.

The elephant, of which there is only one known ſpecies, is, when full grown, from ſeventeen to twenty feet high; and its body is withal ſo enormouſly bulky, that the belly reaches nearer the ground than could eaſily be conceived of a creature of its height. The trunk is, properly ſpeaking, nothing but the noſe continued to a great length; its ſubſtance is fleſhy, but firm, being compoſed of three ſeries or orders of fibres: this trunk the creature can contract or protrude forward with great violence, from the length of one foot to five or more.

Knights of the ELEPHANT, an order of knighthood in Denmark, conferred upon none but perſons of the firſt quality and merit. It is alſo called the order of St. Mary. Its inſtitution is ſaid to have been owing to a gentleman among the daniſh croiſees having killed an elephant, in an expedition againſt the Sarracens, in 1184, in memory of which king Canutus inſtituted this order, the badge of which is a towered elephant, with an image of the holy virgin encircled with rays, and hung on a watered ſky-coloured ribbon, like the George in England.

ELEPHANTIASIS, ελεφαντιασις, called alſo lepra Arabum, in medicine, a chronical diſeaſe, one of the two ſpecies of leproſy, which affects the whole body, where even the bones as well as the ſkin are covered with ſpots and tumours, which being red, at laſt turn black. See the article LEPROSY.

In this diſeaſe the body falls away, while the legs and feet are enormouſly ſwelled. When the diſeaſe is inveterate, the fingers and toes are hid in the tumour, and a ſlight fever ariſing, carries the patient off.

Lucretius ſuppoſed this diſeaſe to be generated in Egypt, and no where elſe; but if the leproſy of the Jews is the ſame with that of the negroes, which is highly probable, then it may be affirmed that it is endemial to the ſouthern and inland parts of Africa.

ELEPHANTINE, in roman antiquity, an appellation given to the books wherein were regiſtered the tranſactions of the ſenate and magiſtrates of Rome, of the emperors or generals of armies, and even of the provincial magiſtrates; the births and claſſes of the people, and other things relating to the cenſus.

They are ſuppoſed to have been ſo called as being made of ivory; though ſome will have them to have been written on the inteſtines of elephants.

ELEPHANTOPUS, BASTARD SCABIOUS, in botany, a genus of the ſyngeneſia-polygamia æqualis claſs of plants, the compound flower of which is tubuloſe, conſiſting of four or five hermaphrodite and ligulated corollulæ, with a narrow limb, divided into five nearly equal ſegments: the ſtamina are five very ſhort filaments: the ſeeds are ſolitary, and contained in the cup, being of a compreſſed figure, and crowned with briſtly hairs.

ELEPHAS, the ELEPHANT, in zoology. See the article ELEPHANT.

ELEVATION, *elevatio*, the ſame with altitude or height. See ALTITUDE.

Angle of ELEVATION, in gunnery, that comprehended between the horizon and the line of direction of a cannon or mortar; or it is that which the chaſe of a piece, or the axis of its hollow cylinder, makes with the plane of the horizon.

ELEVATION, in architecture, the ſame with an orthographic, or upright draught of a building. See ORTHOGRAPHY.

ELEVATION *of the hoſt*, in the church of Rome,

Rome, that part of the mafs where the prieft raifes the hoft above his head for the people to adore. See MASS and HOST.

ELEVATOR, in anatomy, the name of feveral mufcles, fo called from their ferving to raife the parts of the body to which they belong: fuch are the elevator alæ nafæ, the elevator of the auricle or external ear, the elevator of the epiglottis, of the eye-lids, humerus, lips, urethra, and thofe of the anus, called alfo levatores. See MUSCLE.

The elevator of the eye-lids is alfo called fuperbus, as being ufed when people put on a haughty or high look.

ELEVATORY, *elevatorium*, in furgery, an inftrument for raifing depreffed or fractured parts of the fcull, to be applied after the integuments and periofteum are removed. If there is any hole, the inftrument muft be faftened to it; but if there is none, the fcrew-end of the inftrument muft be applied. See plate LXXXV. fig. 3. n° 1.

But as thefe elevatories are fo contrived, that, where the neighbouring bones are fractured or depreffed, they cannot be applied without greatly increafing the pain, furgeons have invented another kind which might be applied with more fafety, called *tripes*, from the number of its feet. It is near twice as big as the figure we have given of it; (*ibid.* n° 2.) and the feet A A A ftand nearer or farther from each other, as there is occafion. The manner of applying it is this: the feet are to be applied to the found parts of the head, and the fcrew B C, by frequently turning its handle D D, will prefently lay hold of the depreffed part of the cranium, efpecially if a fmall hole has been made in it with the point of a fharp awl. Then upon turning the fcrew, E E, the trepan is raifed by degrees, and with it the depreffed part of the cranium. But if any opening fhall appear between the fractured parts, it will be proper to take off the pointed end of the inftrument B, and in its room fix the elevatory G, by the fcrew H, about the part F of the figure n° 2. by the affiftance of which it will be eafy to raife the depreffed part. See the manner of applying this inftrument reprefented *ibid.* n° 3. See the article TREPANNING.

ELEVE, a french term, fometimes met with in our language, fignifying a difciple.

Formerly there were twenty eleves in the academy of fciences at Paris, and ten in that of infcriptions; but the term has fince been changed for an adjunct. See the articles ACADEMY and ADJUNCT.

ELEUSINIA, in grecian antiquity, a feftival kept in honour of Ceres, every fourth, by fome ftates, but by others, every fifth year. The Athenians celebrated it at Eleufis, a town of Attica, whence the name.

It was celebrated with a world of ceremony, and perfons of both fexes were initiated in it; being deemed impious to neglect doing fo. The myfteries were of two forts, the leffer, and the greater; whereof the former were facred to Proferpine, Ceres's daughter, and the latter to Ceres herfelf. According to Lactantius, they confifted in a myftical reprefentation of what mythologifts teach of Ceres; though fome of the chriftian fathers will have the great myftery, or fecret, which they were forbidden by law, upon pain of death, to divulge, to have been the reprefentation or figures of both male and female privities, which were handed about and expofed to the company.

ELEUTHERIA, another feftival celebrated at Platæa, by delegates from almoft all the cities of Greece, in honour of Jupiter Eleutherius, or the affertor of liberty.

It was inftituted in memory of the victory obtained by the Grecians, in the territories of Platæa, over Mardonius, the perfian general, left by Xerxes with a mighty army to fubdue Greece.

ELF, a term, now almoft obfolete, formerly ufed to denote a fairy, or hobgoblin, an imaginary being, the creature of ignorance, fuperftition and craft. See the article FAIRY.

ELF-ARROWS, in natural hiftory, a name given to the flints, antiently fafhioned into arrow-heads, and ftill found foffile in Scotland, America, and feveral other parts of the world.

ELGIN, the capital of the county of Murray, in Scotland, fituated on the river Lofey, about fix miles north of the Spey: weft longitude 2° 25′, north latitude 57° 40′.

ELICIT, in ethics, is applied to an act of the will immediately produced by, and of, the will, and received within the fame: as to be willing, unwilling, loving, hating, &c. Acts of which nature are termed elicit, becaufe that, being before in the power of the will, they are now brought forth into act. But they are fo far intrinfic, that fome authors confider them as the will itfelf,

and

and deny that they ought to be diftinguifhed from it any more than light is to be diftinguifhed from the fun.

ELIGENDO VIRIDARIO. See the article VIRIDARIO ELIGENDO.

ELIGIBILITY, in the romifh canon law, a bull granted by the pope, to certain perfons, to qualify them to be chofen to an office, or dignity, whereof they were before incapable by want of age, birth, or the like.

ELIQUATION, in metallurgy, a feparation of the different parts of mixed bodies, by the different degrees of fire required to melt them.

When the nature of ores, or of metallic mixtures, is fuch, that while one part of them melts in the fire, the other, more refractory and difficult of fufion, remains ftill folid; the firft, when the mafs is placed in a mild fire, flows out of the interftices of the other, and is thus feparated from it. The perfection of this operation requires a different fluidity of the parts that conftitute the mafs. Lead, for inftance, melts into one mafs with copper, by a ftrong fire, whereas thefe metals cannot diffolve each other in a moderate one, but if the mafs compofed of both thefe, thus blended together, is afterwards expofed to a mild fire on an inclined plane, the lead alone melts, the copper becoming only brittle and fpungy, and remaining in its folid form, even when the lead has run out of it. This feparation, however, is not fo perfectly made, but that there ever remains fome lead in the copper, and fome fmall part of the copper is alfo carried away with the lead: wherefore, it is neceffary, for this experiment, that the metals are not mixed in too minute proportions; for if one thoufandth part of lead were to be mixed with copper, or the fame fmall proportion of copper with the lead, the feparation by eliquation could not be effected.

It is generally neceffary alfo, to make this operation fucceed, to add ingredients that are capable either of deftroying the force by which the different parts cohere together, or of procuring an eafier flux of the metals: for the mixture of the other metals will not be feparated like thofe of copper and lead, without the admixture of other fubftances. For inftance, gold, filver, and copper melted together, and perfectly blended by that means with one another, remain in the fame ftate in any degree of fire; to make the eliquation of the gold and filver, therefore, out of fuch a mixture, the fame additions muft be ufed as in the operation of precipitation by fufion.

ELISION, in grammar, the cutting off, or fuppreffing a vowel at the end of a word, for the fake of found, or meafure, the next word beginning with a vowel.

Elifions are pretty frequently met with in englifh poetry, but more frequently in the Latin, French, *&c.* They chiefly confift in fuppreffions of the *a*, *e*, and *i*, though an elifion fuppreffes any of the other vowels. In the following example from Virgil there are three elifions.

Phillida amo ante alias ------

ELIXATION, in pharmacy, the extracting the virtues of ingredients by boiling or ftewing. See DECOCTION.

ELIXIR, in medicine, a compound tincture extracted from many efficacious ingredients, Hence the difference between a tincture and an elixir feems to be this, that a tincture is drawn from one ingredient, fometimes with an addition of another to open it, and to difpofe it to yield to the menftruum; whereas an elixir is a tincture extracted from feveral ingredients at the fame time. See the article TINCTURE.

There are a great number of elixirs defcribed by chemical writers, and in the difpenfatories, the moft remarkable of which are prepared as follows.

ELIXIR *of aloes.* Take of the tincture of myrrh a quart; faffron, foccotrine aloes, of each three ounces. After digeftion, ftrain off the fpirit.

Paregoric ELIXIR. Take flowers of benjamin, and opium, ftrained, of each a dram; of camphor, two fcruples; of the effential oil of anifeeds half a dram, or rectified fpirit of wine a quart. After digeftion, ftrain off the fpirit.

Proprietatis ELIXIR. See the article PROPRIETATIS ELIXIR.

Acid ELIXIR *of vitriol.* Take of the aromatic tincture a pint; of the ftrong fpirit, or oil of vitriol, the weight of four ounces; mix them gradually, and when the fæces are fubfided, filtre thro' paper.

Dulcified ELIXIR *of vitriol.* Take of aromatic tincture a pint; of dulcified fpirit of vitriol, eight ounces in weight; mix them. This preparation is intended for ftomachs which cannot bear the acidity of the preceding.

The compound ELIXIR *of myrrh.* Take of the extract of favine, one ounce; of the tincture of caftor, a pint; of the tincture

of myrrh, half a pint. After digeſtion, ſtrain off the liquor.

ELK, *alce*, in zoology, an animal of the deer-kind, with the horns palmated, and without a ſtem. It is a native of the northern parts of Europe, and is a very large and ſtrong animal; being equal in ſize to a horſe, but much leſs beautiful. See plate LXXXVIII. fig. 2.

Elk's hoofs ſtand recommended for the cure of the epilepſy, but at preſent are only uſed as an ingredient in ſome old compoſitions.

ELKHOLM, a port-town of Gothland, in Sweden, twenty-four miles weſt of Carelſcroon.

ELL, *ulna*, a meaſure of length, different in different countries; but thoſe moſtly uſed in England, are the engliſh and flemiſh ells; whereof the former is three feet nine inches, or one yard and a quarter; and the latter only twenty-ſeven inches, or three quarters of a yard. In Scotland, the ell contains $37\frac{2}{10}$ engliſh inches. See MEASURE.

ELLERENA, a town of Eſtremadura, in Spain, fifty miles ſouth-eaſt of Merida.

ELLIPOMACROSTYLA, in natural hiſtory, a genus of imperfect cryſtals, with ſingle pyramids; one end of their column being affixed to ſome ſolid body. They are dodecahedral, with thinner hexangular columns, and hexangular pyramids. See the article CRYSTAL.

Of theſe cryſtals authors enumerate a great many ſpecies; among which are the whitiſh pellucid ſprig cryſtal, a bright brown kind, a dull brown kind, and a bright yellow kind, all which are farther diſtinguiſhed according to the different lengths of their pyramids.

ELLIPOPACHYSTYLA, in natural hiſtory, a genus of imperfect cryſtals, compoſed of twelve planes, in an hexangular column, terminated by an hexangular pyramid at one end, and irregularly affixed to ſome other body at the other, with ſhorter columns. See the article CRYSTAL.

There are two ſpecies of theſe cryſtals, one ſhort, bright and colourleſs, found in great plenty in New Spain, and other parts of America; the other a ſhort, dull, and duſky brown one, found in Germany and ſometimes in England.

ELLIPSIS, in geometry, a curve line returning into itſelf, and produced from the ſection of a cone by a plane cutting both its ſides, but not parallel to the baſe. See CONIC SECTIONS.

The eaſieſt way of deſcribing this curve, in plano, when the tranſverſe and conjugate axes A B, E D, (plate LXXXVII. fig. 3. n° 1.) are given, is thus: Firſt take the points *F*, *f*, in the tranſverſe axis A B, ſo that the diſtances, C F, C *f*, from the center C, be each equal to $\sqrt{\overline{AC}-\overline{CD}}$; or, that the lines F D, *f* D, be each equal to A C. Then, having fixed two pins in the points F, *f*, which are called the foci of the ellipſis, take a thread equal in length to the tranſverſe axis A B; and faſtening its two ends, one to the pin F, and the other to *f*, with another pin M ſtretch the thread tight: then if this pin M be moved round till it returns to the place from whence it firſt ſet out, keeping the thread always extended ſo as to form the triangle F M *f*, it will deſcribe an ellipſis, whoſe axes are A B, D E.

The greater axis, A B, paſſing through the two foci F *f*, is called the tranſverſe axis; and the leſſer one D E, is called the conjugate, or ſecond axis: theſe two always biſect each other at right angles, and the center of the ellipſis is the point C, where they interſect. Any right line paſſing through the center, and terminated by the curve of the ellipſis on each ſide, is called a diameter; and two diameters, which naturally biſect all the parallels to each other, bounded by the ellipſis, are called conjugate diameters. Any right line, not paſſing through the center, but terminated by the ellipſis, and biſected by a diameter, is called the ordinate, or ordinate applicate, to that diameter. And a third proportional to two conjugate diameters, is called the latus rectum, or parameter of that diameter which is the firſt of the three proportionals.

The reaſon of the name is this: let B A, E D, be any two conjugate diameters of an ellipſis (ſee plate LXXXVII. fig. 3. n° 2, where they are the two axes) at the end A, of the diameter A B, raiſe the perpendicular A F, equal to the latus rectum, or parameter, being a third proportional to A B, E D, and draw the right line B F: then if any point P be taken in B A, and an ordinate P M be drawn, cutting B F in N, the rectangle under the abſciſs A P, and the line P N will be equal to the ſquare of the ordinate P M. Hence drawing N O parallel to A B, it appears that this rectangle, or the ſquare of the ordinate, is leſs than that under the abſciſs A P, and the parameter A F, by the rectangle under

der A P and O F, or N O and O F; on account of which deficiency, Apollonius first gave this curve the name of an ellipsis, from ἐλλείπειν, to be deficient.

In every ellipsis, as A E B D, (*ibid.* n° 2.) the squares of the semi-ordinates M P, *m p*, are as the rectangles under the segments of the transverse axis A P × P B, A *p* × *p* B, made by these ordinates respectively; which holds equally true of the circle, where the squares of the ordinates are equal to such rectangles, as being mean proportionals between the segments of the diameter. In the same manner, the ordinates to any diameter whatever, are as the rectangles under the segments of that diameter.

As to the other principal properties of the ellipsis, they may be reduced to the following propositions. 1. If from any point M in an ellipsis, two right lines, M F, M *f*, (*ibid.* n° 1.) be drawn to the foci F, *f*, the sum of these two lines will be equal to the transverse axis A B. This is evident from the manner of describing an ellipsis. 2. The square of half the lesser axis is equal to the rectangle under the segments of the greater axis, contained between the foci and its vertices; that is, $DC^2 = AF \times FB = Af + fB$. 3. Every diameter is bisected in the center C. 4. The transverse axis is the greatest, and the conjugate axis the least, of all diameters. 5. Two diameters, one of which is parallel to the tangent in the vertex of the other, are conjugate diameters; and vice versa, a right line drawn thro' the vertex of any diameter parallel to its conjugate diameter, touches the ellipsis in that vertex. 6. If four tangents be drawn through the vertices of two conjugate diameters, the parallelogram contained under them will be equal to the parallelogram contained under tangents drawn through the vertices of any other two conjugate diameters. 7. If a right line, touching an ellipsis, meet two conjugate diameters produced, the rectangle under the segments of the tangent, between the point of contact and these diameters, will be equal to the square of the semi-diameter, which is conjugate to that passing thro' the point of contact. 8. In every ellipsis, the sum of the squares of any two conjugate diameters, is equal to the sum of the squares of the two axes. 9. In every ellipsis, the angles F G I, *f* G H, (*ibid.* n° 1.) made by the tangent H I, and the lines F G, *f* G, drawn from the foci to the point of contact, are equal to each other. 10. The area of an ellipsis is to the area of a circumscribed circle, as the lesser axis is to the greater, and vice versa, with respect to an inscribed circle; so that it is a mean proportional between two circles, having the transverse and conjugate axes for their diameters. This holds equally true of all the other corresponding parts belonging to an ellipsis.

The curve of any ellipsis may be obtained by the following series. Suppose the semi-transverse axis $CB = r$, the semi-conjugate axis $CD = c$, and the semi-ordinate $= a$; then the length of the curve $MB = a + \frac{r^2 a^3}{6 c^4} + \frac{4 r^2 c^2 a^5 - r a^5}{40 c^8} + \frac{8 c^4 r^2 a^7 + r^6 a^7 - 4 c^2 r^5 a^7}{112 c^{12}}$, &c. And, if the species of the ellipsis be determined, this series will be more simple: for if $c = 2r$, then $MB = a + \frac{a^3}{96 r^2} + \frac{3 a^5}{2048 r^4} + \frac{113 a^7}{458752 a^6} + \frac{3419 a^9}{75497472 r^8}$, &c. This series will serve for an hyperbola, by making the even parts of all the terms affirmative, and the third, fifth, seventh, &c. terms negative.

The periphery of an ellipsis, according to Mr. Simpson, is to that of a circle, whose diameter is equal to the transverse axis of the ellipsis, as $1 - \frac{d}{2.2} - \frac{3 d^2}{2.2.4.4} - \frac{3.3.5 d^3}{2.2.4.4.6.6} - \frac{2.3.5.5.7 d^4}{2.2.4.4.6.6.8.8}$, &c. is to 1, where d is equal to the difference of the squares of the axes applied to the square of the transverse axis.

Those who desire to be more particularly informed concerning the properties of the ellipsis, may consult Simpson's Conic Sections, and Wolfius's Elements of Mathematics, tom. 1. also Maclaurin's Fluxions, Art. 609. seq. and the marquis de l'Hospital's Sect. Conic. lib. 6.

Infinite ELLIPSIS. See ELLIPTOIDES.

Quadrature of the ELLIPSIS. See the article QUADRATURE.

ELLIPSIS, in grammar, a figure of syntax, wherein one or more words are not expressed; and from this deficiency, it has got the name ellipsis.

To this figure, besides the ellipsis properly so called, belong apposition, synecdoche, asyndeton, zeugma, syllepsis, and prolepsis. See the articles APPOSITION, SYNECDOCHE, &c.

The ellipsis, properly so called, is when the deficient word or words must be supplied

plied from elfewhere; as *Hectoris Andromache*, where *uxor* is underftood; that is, Andromache Hector's wife.

ELLIPSIS, in rhetoric, a figure nearly allied to preterition, when the orator, through tranfport of paffion, paffes over many things; which, had he been cool, ought to have been mentioned.

In preterition, the omiffion is defigned; which, in the ellipfis, is owing to the vehemence of the fpeaker's paffion, and his tongue not being able to keep pace with the emotion of his mind.

ELLIPTIC, or ELLIPTICAL, fomething belonging to an ellipfis. See ELLIPSIS.

Thus we meet with elliptical compaffes, elliptic conoid, elliptic fpace, elliptic ftairs, &c. See the articles COMPASSES, CONOID, &c.

The elliptic fpace is the area contained within the curve of the ellipfis, which is to that of a circle defcribed on the tranfverfe axis, as the conjugate diameter is to the tranfverfe axis; or it is a mean proportional between two circles, defcribed on the conjugate and tranfverfe axis.

ELLIPTOIDES, in geometry, a name ufed by fome to denote infinite ellipfes, defined by the equation $ay^{m+n} = bx^m (a-x)^n$.

Of thefe there are feveral forts: thus, if $ay^3 = bx^2 (a-x)$ it is a cubical elliptoid; and if $ay^4 = bx^2 (a-x)^2$, it denotes a biquadratic elliptoid, which is an ellipfis of the third order in refpect of the appollonian ellipfis.

ELM, *ulmus*, in botany. See ULMUS.

The elm is very ferviceable in places where it may lie continually dry, or wet in extremes. Accordingly, it is proper for water-works, mills, the ladles and foles of the wheel-pipes, pumps, aqueducts, pales, and fhip-planks beneath the water-lines. It is alfo of ufe for wheelwrights, handles for fingle faws, axletrees, and the like. The clearnefs of the grain, makes it alfo fit for all kinds of carved works, and moft ornaments relating to architecture. As to the medicinal ufes of elm, the leaves are aftringent, and the bark good for affuaging the pains of the gout.

ELNA, a town of Catalonia in Spain, but fubject to France, fituated ten miles fouth of Perpignan.

ELOCUTION, in rhetoric, the adapting words and fentences to the things or fentiments to be expreffed. It confifts of elegance, compofition, and dignity.

The firft, comprehending the purity and perfpicuity of a language, is the foundation of elocution. The fecond ranges the words in proper order; and the laft adds the ornaments of tropes and figures to give ftrength and dignity to the whole. See STYLE, PERIOD, FIGURE.

ELOGY, *elogium*, a praife or panegyric beftowed on any perfon or thing, in confideration of its merit. The beauty of elogy confifts in an expreffive brevity. Elogiums fhould not have fo much as one epithet properly fo called, nor two words fynonymous. They fhould ftrictly adhere to truth; for extravagant and improbable elogies rather leffen the character of the perfon or thing they would extol.

ELOHIM, ELOHI, or ELOI, in fcripture language, one of the names of God. See the article GOD.

Angels, princes, great men, judges, and even falfe gods are fometimes called by this name. The fequel of the difcourfe, Calmet obferves, is what affifts us in judging rightly concerning the true meaning of this word. It is the fame as Eloha; one is the fingular, the other the plural. Neverthelefs, Elohim is often conftrued in the fingular number, particularly when the true God is fpoken of; but when falfe gods is fpoken of, it is conftrued rather in the plural.

ELOINED, in law, fignifies reftrained or hindered from doing fomething: thus it is faid, that if thofe within age be eloined, fo that they cannot fue perfonally, their next friends fhall fue for them.

ELONGATION, in aftronomy, the digreffion or recefs of a planet from the fun, with refpect to an eye placed on our earth. The term is chiefly ufed in fpeaking of Venus and Mercury, the arch of a great circle intercepted between either of thefe planets and the fun, being called the elongation of that planet from the fun.

But here it is to be obferved, that it is only a circle which has the fun for its center; that the greateft elongation is in a line touching the planet's orbit. For in an elliptic orbit it may be, that the elongation from the fun may grow ftill greater, even after it has left the place where the line joining the earth and planet touches the orbit. For after that, the true diftance of the planet from the fun may increafe, whilft the diftance of the fun and planet from the earth does not increafe, but rather decreafe. But, becaufe the orbits of the planets are

nearly

nearly circular, ſuch ſmall differences may be neglected in aſtronomy. The greateſt elongation of Venus is found by obſervatian to be about forty-eighty degrees, and the greateſt elongation of Mercury about twenty-eight degrees, upon which account this planet is rarely to be ſeen with the naked eye. See the articles PLANET, VENUS, MERCURY, &c.

ELONGATION, is alſo uſed for the difference in motion between the ſwifteſt and the ſloweſt of two planets, or the quantity of ſpace whereby the one has overgone the other.

Angle of ELONGATION is an angle contained under lines drawn from the center of the ſun and planet to the center of the earth.

ELONGATION, in ſurgery, is an imperfect luxation, occaſioned by the ſtretching or lengthening of the ligaments of any joint. See the article LUXATION.

ELOPEMENT, in law, is where a married woman departs from her huſband, and cohabits with an adulterer; in which caſe the huſband is not obliged to allow her any alimony out of his eſtate, nor is he chargeable for neceſſaries for her of any kind. However, the bare advertiſing a wife in the Gazette, or other public papers, is not a legal notice to perſons in general not to truſt her; tho' a perſonal notice given by the huſband to particular perſons, is ſaid to be good.

An action lies, and large damages may be recovered, againſt a perſon for carrying away and detaining another man's wife.

ELOQUENCE, the art of ſpeaking well, ſo as to affect and perſuade.

Cicero defines it, the art of ſpeaking with copiouſneſs and embelliſhment.

Eloquence and rhetoric differ from each other, as the theory from the practice; rhetoric being the art which deſcribes the rules of eloquence, and eloquence that art which uſes them to advantage. For the moſt part, however, they are uſed indiſcriminately for each other. See the articles RHETORIC, ORATORY, INVENTION, DISPOSITION, EXPRESSION, PRONUNCIATION, ACTION, &c.

ELSIMBURG, a port-town of Sweden, about ſeven miles eaſt of Elſinore.

ELSINORE, a port-town of Denmark, about twenty-two miles north of Copenhagen, and ſituated on the Sound, or the entrance into the Baltic ſea.

ELTZ, a town of lower Saxony, about eleven miles ſouth-weſt of Hildeſheim.

ELVAS, a city and biſhop's ſee of Alentejo, in Portugal, ſituated near the frontiers of ſpaniſh Eſtremadura: weſt long. 7° 35′, and north lat. 38° 45′.

It is one of the ſtrongeſt fortreſſes in Portugal.

ELVELA, in botany, a genus of funguſes ſmooth both on the upper and under ſide. Micheli calls this genus fungoides and fungoidaſter.

ELUL, in antient chronology, the twelfth month of the jewiſh civil year, and the ſixth of the eccleſiaſtical: it conſiſted of only twenty-nine days, and anſwered pretty nearly to our Auguſt.

ELUTRIATION, in metallurgy, the ſeparating the lighter matters from the mixt ores of metals, by means of great quantities of fair water. Solid bodies not diſſoluble in water, are by this operation ſeparated from each other, by water very well ſtirred, ſo that the lighter and more ſubtile parts are carried away by the water, while the heavier and more ſolid bodies remain at the bottom of the veſſels. Some of the ſtones, earths, and other bodies naturally mixt with the ores of metals, are much lighter than the metalline parts of theſe ores, and are therefore very eaſily ſeparated by elutriation, either by barely pounding and waſhing them, or by previous calcination, and then extinguiſhing them in water, and waſhing them.

The kinds of ores proper for elutriation are known, 1. By the heterogeneous matter, and the ores themſelves being in ſuch large maſſes, as to be very viſible, and eaſily broken and ſeparated by hammers, wedges, &c. 2. By the great ſpecific gravity of the ore, which ſhews us that the metallic maſſes adhere to their matrix in firm ſolid molecules, and are not ſcattered and diſperſed ſparingly through it. 3. From the lightneſs of the ſtony matrix. And, 4. From its brightneſs, whether this properly be naturally inherent in the ſtony matter, or procured by fire in calcination; for in each caſe it renders the comminution of the compound maſs eaſy. In this caſe, however, it is neceſſary that the ore itſelf be of a nature ſufficiently fixed, and that it do not fly off in the roaſting, but only melt into ſolid ſpheroidical molecules. See Cramer's Art. Docim. pars i. § 381, 535.

ELY, a city and biſhop's ſee of Cambridgeſhire, ſituated about twelve miles north of Cambride: eaſt long. 15′, and north lat. 52° 24′.

It is a county of itſelf, including the territory around, and has a judge who determines

determines all caufes civil and criminal within its limits.

ELYMUS, in botany, a genus of the triandria-digynia clafs of plants, the calyx of which is a common involucrum, confifting of four leaves, and containing feveral flowers in two fpiculæ: the particular corollæ are compofed of two valves: the feed is oblong.

ELYSIUM, or ELYSIAN FIELDS, in heathen mythology, certain plains abounding with woods, fountains, verdure, and every delightful object; fuppofed to be the habitation of heroes and good men, after death.

According to fome, the fable of elyfium is of phœnician extraction, or rather founded upon the account of paradife delivered in the fcriptures. As to the fituation of thefe happy regions, authors are not agreed: Homer makes them the fame with certain pleafant meadows near Memphis, on the banks of the acherufian lake, mentioned by Diodorus Siculus, in his defcription of the funeral of the Egyptians. Virgil feems to place them in Italy, only under-ground: and others in other places. But the generality of authors will have them to be fituated in the Fortunate Iflands. See the article FORTUNATE ISLANDS.

ELYTROIDES, or VAGINALIS, in anatomy, the fecond proper membrane that involves the teftes. See the article TESTICLE.

EMANATION, the act of flowing or proceeding from fome fource or origin; or, the thing that proceeds from that action.

EMANATION, among fchoolmen, is ufed for the production of a leffer thing, in order to the production of a greater, by virtue of fome natural connection or dependance between them: for, as when feveral moveables are joined together, the fame power that moves the firft, moves all the reft; as in pulling up the trunk of a tree, you pull up the branches, roots, *&c.* or in drawing one link of a chain, you bring forward all the reft: the fame is to be underftood in all conjunct natural effects, *viz.* that the fame power whereby the firft is produced, does alfo produce all the reft naturally connected to it, in that, by means of the connection the action of the agent is conveyed from the one to the other, fo that the firft determines the agent to the production of all the reft; and hence that is called an emanative caufe, in contradiftinction to an efficient caufe, which produces an effect by its mere prefence, without the intervention of any action.

EMANCIPATION, in the roman law, the fetting free a fon from the fubjection of his father; fo that whatever moveables he acquires, belong in propriety to him, and not to his father, as before emancipation.

Emancipation put the fon in capacity of managing his own affairs, and of marrying without his father's confent, though a minor. Emancipation differs from manumiffion, as the latter was the act of a mafter in favour of a flave, whereas the former was that of a father in favour of his fon.

There were two kinds of emancipation, the one tacit, which was by the fon's being promoted to fome dignity, by his coming of age, or by his marrying, in all which cafes he became his own mafter of courfe.

The other exprefs; where the father declared before a judge, that he emancipated his fon. In performing this, the father was firft to fell his fon imaginarily to another, whom they called *pater fiduciarius*, father in truft, of whom being bought back again by the natural father, he manumitted him before the judge, by a verbal declaration. See MANUMISSION.

Emancipation ftill obtains in France with regard to minors or pupils, who are hereby fet at liberty to manage their own effects, without the advice or direction of their parents or tutors.

EMARGINATED, among botanifts, an appellation given to fuch leaves as have a little indenting on their fummits: when this indenting is terminated on each fide by obtufe points, they are faid to be obtufely emarginated; whereas when thefe points are acute, they are called acutely emarginated.

EMASCULATION, the act of caftrating or depriving a male of thofe parts which characterize his fex. See the article CASTRATION.

EMAUX DE L'ESCU, in heraldry, the metal and colour of the fhield or efcutcheon. See the article SHIELD.

EMBALMING, is the opening a dead body, taking out the inteftines, and filling the place with odoriferous and deficcative drugs and fpices, to prevent its putrifying. The Egyptians excelled all other nations in the art of preferving bodies from corruption; for fome that they have embalmed

balmed upwards of two thousand years ago, remain whole to this day, and are often brought into other countries as great curiosities. Their manner of embalming was thus: they scooped out the brains with an iron scoop, out at the nostrils, and threw in medicaments to fill up the vacuum: they also took out the entrails, and having filled the body with myrrh, cassia, and other spices, except frankincense, proper to dry up the humours, they pickled it in nitre, where it lay soaking for seventy days. The body was then wrapped up in bandages of fine linen and gums, to make it stick like glue, and so was delivered to the kindred of the deceased, entire in all its features, the very hairs of the eye-lids being preserved. They used to keep the bodies of their ancestors, thus embalmed, in little houses magnificently adorned, and took great pleasure in beholding them, alive as it were, without any change in their size, features, or complexion. The Egyptians also embalmed birds, *&c.* The prices for embalming were different; the highest was a talent, the next twenty minæ, and so decreasing to a very small matter: but they who had not wherewithal to answer this expence, contented themselves with infusing, by means of a syringe, thro' the fundament, a certain liquor extracted from the cedar, and leaving it there, wrapped up the body in salt of nitre: the oil thus preyed upon the intestines, so that when they took it out, the intestines came away with it, dried, and not in the least putrified: the body being inclosed in nitre, grew dry, and nothing remained besides the skin glued upon the bones.

EMBARCADERO, in the spanish commerce, the port-town of some considerable inland city; such is Ari a to Potosi. See the articles ARICA and POTOSI.

EMBARGO, in commerce, an arrest on ships, or merchandize, by public authority; or a prohibition of state, commonly on foreign ships, in time of war, to prevent their going out of port; sometimes to prevent their coming in; and sometimes both, for a limited time.

The king may lay embargoes on ships, or employ those of his subjects, in time of danger, for service and defence of the nation; but they must not be for the private advantage of a particular trader, or company; and therefore a warrant to stay a single ship is no legal embargo. No inference can be made from embargoes which are only in war-time; and are a prohibition by advice of council, and not at prosecution of parties. If goods be laden on board, and after an embargo, or restraint from the prince or state, comes forth, and then the master of the ship breaks ground, or endeavours to sail, if any damage accrues, he must be responsible for the same; the reason is, because his freight is due, and must be paid, nay though the goods be seized as contraband.

Embargo differs from quarantine, insomuch as this last is always for the term of forty days, in which persons from foreign parts infected with the plague, are not permitted to come on shore. See the article QUARANTINE.

EMBASSADOR, or AMBASSADOR, a public minister sent from one sovereign prince, as a representative of his person, to another.

Embassadors are either ordinary or extraordinary. Embassador in ordinary is he who constantly resides in the court of another prince, to maintain a good understanding, and look to the interest of his master. Till about two hundred years ago, embassadors in ordinary were not heard of; all, till then, were embassadors extraordinary, that is, such as are sent on some particular occasion, and who retire as soon as the affair is dispatched.

By the law of nations, none under the quality of a sovereign prince can send or receive an embassador. At Athens, embassadors mounted the pulpit of the public orators, and there opened their commission, acquainting the people with their errand. At Rome, they were introduced to the senate, and delivered their commissions to them.

Embassadors should never attend any public solemnities, as marriages, funerals, *&c.* unless their masters have some interest therein: nor must they go into mourning on any occasions of their own, because they represent the persons of their prince.

By the civil law, the moveable goods of an embassador, which are accounted an accession to his person, cannot be seized on, neither as a pledge, nor for payment of a debt, nor by order or execution of judgment, nor by the king's or state's leave, where he resides, as some conceive; for all actions ought to be far from an embassador, as well that which toucheth his neces-

neceffaries, as his perfon: if therefore, he hath contracted any debt, he is to be called upon kindly, and if he refufes, then letters of requeft are to go to his mafter. Nor can any of the embaffador's domeftic fervants, that are regiftered in the fecretaries of ftate's office, be arrefted in perfon or goods: if they are, the procefs fhall be void, and the parties fuing out and executing it, fhall fuffer and be liable to fuch penalties and corporal punifhment as the lord chancellor, or either of the chief juftices, fhall think fit to inflict. Yet embaffadors cannot be defended when they commit any thing againft that ftate, or the perfon of the prince, with whom they refide; and if they are guilty of treafon, felony, *&c.* or any other crime againft the law of nations, they lofe the privilege of an embaffador, and may be fubject to punifhment as private aliens.

EMBASSY, the office or function of an embaffador. See the preceding article.

The rights of embaffies are, in fome meafure, founded on the law of nature, which authorizes all that is neceffary for procuring and maintaining peace and friendfhip among men. All facred and profane hiftories mention the facred rights of embaffies, and are full of inftances of wars undertaken for violating them. In the fcriptures we read of a war made by king David upon the Ammonites on that account. Cicero fays, that the rights of embaffies are guarded by all laws both divine and human; wherefore to violate this right, is not only unjuft, but impious; and for this reafon, if, for inftance, whilft embaffadors of any nation are refident with us, war be declared againft their fovereigns, they ftill remain at liberty: thus are embaffadors fafe even amidft the arms of contending foes: and in cafe a banifhed man is appointed on an embaffy to the country from whence he is banifhed, he may not be detained or molefted there: and, to fpeak in general, it is an eftablifhed cuftom among all the nations of the world, even barbarians themfelves, to reverence the characters of embaffadors.

EMBATTLED, in heraldry, the fame with crenelle. See the article CRENELLE.

EMBDEN, a port-town and city of Germany, capital of a county of the fame name, now in poffeffion of the king of Pruffia: it is fituated at the mouth of the river Ems: eaft long. 6° 45′, and north lat. 53° 40′.

EMBER-WEEKS, or DAYS, in the chriftian church, are certain feafons of the year, fet apart for the imploring God's bleffing, by prayer and fafting, upon the ordinations performed in the church at fuch times.

Thefe ordination-fafts are obferved four times in the year, *viz.* the Wednefday, Friday, and Saturday after the firft Sunday in lent, after Whit-funday, after the fourteenth of September, and the thirteenth of December; it being enjoined, by a canon of the church, that deacons and minifters be ordained, or made, only upon the fundays immediately following thefe ember-fafts.

The ember-weeks were formerly obferved in different churches with fome variety, but were at laft fettled as they are now obferved, by the council of Placentia, anno 1095. The council of Mentz, convened by Charlemagne, mentions the ember-weeks as a new eftablifhment.

EMBERIZA, in ornithology, a genus of birds, the characters of which are, that the beak is of a conic fhape, each chap whereof is wholly entire at the point; the upper one gapes a little at the bafe from the under, which laft is inflected, or turned inwards, at the fides.

To this genus belong the green-finch, bunting, yellow-hammer, *&c.* See the articles GREEN-FINCH, BUNTING, *&c.*

Befides thefe, the fchomburger of the fpanifh Weft-Indies feems to claim a place among the emberizas: the upper part of the body is of a bright brown colour, fomewhat inclining to orange, and the whole under part is of a pleafant light reddifh brown.

EMBLEM, εμϐλημα, a kind of painted enigma, or certain figures painted or cut metaphorically, expreffing fome action, with reflections underneath, which, in fome meafure, explain the fenfe of the device, and, at the fame time, inftruct us in fome moral truth, or other matter of knowledge. The emblem is fomewhat plainer than the enigma, and the invention is more modern, it being entirely unknown to the antients. P. Bouhours has a long and accurate differtation upon emblems, wherein he has precifely defined their nature, laid down rules for their compofition, and for diftinguifhing the true from the falfe.

The Greeks gave this name to inlaid or mofaic work, and even to all kinds of ornaments of vafes, garments, *&c.* and the Latins ufed emblem in the fame fenfe.

EM-

EMBLEMATICAL, fomething belonging to an emblem. See the preceding article.

EMBLEMENTS, among lawyers, denote the profits of fown lands; but are fometimes ufed, more largely, for any products that naturally arife from the ground.

If a tenant for life fow the land, and afterwards dies, his executors fhall have the emblements, and not the perfon in reverfion. The cafe is otherwife with refpect to a tenant for years; for if he fow the land, and his term expires before he has reaped them, the leffor, or he in reverfion, is entitled to the emblements. Again, if a perfon devifes fown lands by will, and dies before feverance, the devifee fhall have the emblements, provided no exception was made of corn.

EMBOLISMIC, or INTERCALARY, a term ufed by chronologifts in fpeaking of the additional months and years, which they infert to bring the lunar to the folar year. Since the common lunar year confifts of twelve fynodic months, or 354 days nearly, and the folar confifts of 365 days (throwing away the odd hours and minutes) it is plain that the folar year will exceed the lunar by about 11 days; and confequently in the fpace of about 33 years the beginning of the lunar year will be carried through all the feafons, and hence it is called the moveable lunar year. This form of the year is ufed at this time by the Turks and Arabians; and becaufe in three year's time, the folar year exceeds the lunar by 33 days, therefore, to keep the lunar months in the fame feafons and times of the folar year, or near it, chronologifts added a whole month to the lunar year every third year, and fo made it confift of 13 months; this year they called the embolifmic year, and the additional month the embolifmic, or embolimean, or intercalary month. This form of the year is called the fixed lunar year, and it was ufed by the Greeks and Romans till the time of Julius Cæfar. See the articles INTERCALARY, YEAR, *&c.*

EMBOLUS, the moveable part of a pump, or fyringe, called alfo the pifton, or fucker. See the articles PISTON, PUMP, SYRINGE, *&c.*

EMBOSSING, or IMBOSSING, in architecture and fculpture, the forming or fafhioning works in relievo, whether cut with a chiffel, or otherwife.

Emboffing is a kind of fculpture, wherein the figures ftick out from the plane whereon it is cut; and according as the figures are more or lefs prominent, they are faid to be in alto, mezzo, or baffo relievo; or high, mean, or low relief. See the article ENCHASING.

EMBRACE *the volt*, in the manege. A horfe is faid to embrace a volt, when, working upon volts, he makes a good way every time with his fore-legs.

EMBRACEOR, among lawyers, a perfon, who, having received a reward fo to do, comes to the bar with one of the parties, and fpeaks in the cafe; or privily labours the jury, or ftands in court to overlook them, whereby they are awed or put in fear. Actions of this kind will be embracery, whether the jurors give verdict on the fide of the party or not. The penalty of this offence is 20 l. and imprifonment of the party at the difcretion of the court: and may be profecuted either by indictment at common law, as well as by action on the ftatute. But attorneys and other lawyers are excepted.

EMBRASURE, in architecture, the enlargement made of the aperture of a door, or window, on the infide of the wall; its ufe being to give the greater play for the opening of the door, or cafement, or to admit the more light. When the wall is very thick, they fometimes make embrafures on the outfide.

EMBRASURE, in fortification, a hole or aperture in a parapet, through which the cannon are pointed, to fire into the moat or field.

Embrafures are generally twelve feet diftant from one another, every one of them being from fix to feven feet wide without, and about three within: their height above the platform is three feet on that fide towards the town, and a foot and a half on the other fide towards the field; fo that the muzzle may be funk on occafion, and the piece brought to fhoot low.

EMBROCATION, in furgery and pharmacy, an external kind of remedy, which confifts in an irrigation of the part affected, with fome proper liquor, as oils, fpirits, *&c.* by means of a woollen or linen cloth, or a fpunge, dipped in the fame.

The ufe of embrocation is either to attenuate and diflodge fomething obftructed underneath the fkin, to eafe pains, or to irritate the part into more warmth and a quicker fenfe of feeling.

The pumping ufed in natural baths is properly an embrocation.

EMBROIDERY, a work in gold, or filver,

ver, or silk-thread, wrought by the needle upon cloth, stuffs, or muslin, into various figures. In embroidering stuffs, the work is performed in a kind of loom, because the more the piece is stretched, the easier it is worked. As to muslin, they spread it upon a pattern ready designed; and sometimes, before it is stretched upon the pattern, it is starched, to make it more easy to handle. Embroidery on the loom is less tedious than the other, in which while they work flowers, all the threads of the muslin, both lengthwise and breadthwise, must be continually counted; but on the other hand this last is much richer in points, and susceptible of greater variety. Cloths too much milled are scarce susceptible of this ornament, and in effect we seldom see them embroidered. The thinnest muslins are the best for this purpose, and they are embroidered to the greatest perfection in Saxony: in other parts of Europe, however, they embroider very prettily, and especially in France.

There are several kinds of embroidery, as, 1. Embroidery on the stamp, where the figures are raised and rounded, having cotton or parchment put under them to support them. 2. Low embroidery, where the gold and silver lie low upon the sketch, and are stitched with silk of the same colour. 3. Guimped embroidery: this is performed either in gold or silver; they first make a sketch upon the cloth, then put on cut vellum, and afterwards sew on the gold and silver with silk-thread: in this kind of embroidery they often put gold and silver cord, tinsel, and spangles. 4. Embroidery on both sides; that which appears on both sides of the stuff. 5. Plain embroidery, where the figures are flat and even, without cords, spangles, or other ornaments.

EMBRUN, or AMBRUN, a city of Dauphiny, in France, near the confines of Piedmont: east long. 6° 6′, and north lat. 44° 35′.

EMBRYO, in physiology, the first rudiments of an animal in the womb, before the several members are distinctly formed; after which period it is denominated a fœtus. See the articles CONCEPTION, GENERATION, and FOETUS.

EMBRYO SULPHUR, *embryonatum sulphur*, that united with metals or other mineral substances. See SULPHUR.

EMBRYO WORMS, those contained in the bodies of viviparous two-winged flies, in surprizing multitudes. See the articles FLY and WORM.

EMBRYOTHLASTES, in midwifery, an instrument contrived for breaking the bones, for the more easy extraction of the fœtus, in difficult labours. See the article DELIVERY.

EMBRYOTOMY, the cutting a fœtus to pieces whilst in the womb, practised in cases of necessity, when there is no other way of saving the mother.

EMBRYULCUS, a hook for extracting the child in difficult labours. See plate LXVIII. fig. 2. where n° 1. represents the broad steel-hook of Palfynus, for extracting a live-infant without danger, when its head sticks in the vagina. It is necessary to have two of them, that one may be applied to each side of the head. N° 2. is the hook commonly used for extracting dead fœtuses. See the article DELIVERY.

EMENDALS, in the accounts of the Inner-temple society, at London, where so much *in emendals*, at the foot of an account, signifies so much money in the bank, or stock of the house, for repairing losses, and to supply other emergencies.

EMENDATIO PANIS, &c. in law. See the article ASSIZE.

EMERALD, *smaragdus*, in natural history, a genus of precious stones, of a green colour, and next in hardness to the ruby.

Our jewellers distinguish emeralds into two kinds, the oriental and occidental; the emeralds of the East-Indies are evidently finer than those of any other part of the world; but our jewellers, seldom meeting with these, call the american emeralds the oriental, and usually sell crystal accidentally tinged with green, under the name of the occidental emerald: these being also the most common, there has grown an opinion among the lapidaries, that the emerald is no harder than the crystal; because what they take to be emeralds, are in general only crystals.

The genuine emerald, in its most perfect state, is, perhaps, the most beautiful of all the gems: it is found of various sizes, but usually small; a great number of them are met with of about the sixteenth part of an inch in diameter, and they are found from this to the size of a walnut. We have accounts of very large sizes among the antients; but they are certainly erroneous, the stones not being emeralds, but jaspers or other green stones: the larger specimens are at present very scarce, and

and are of confiderable value, tho' much more-fo, when of the Eaft or Weft-indies. The emerald is of different figures like the diamond and many of the other gems, being fometimes found in a roundifh or pebble-like form, but much more frequently in a columnar one, refembling common cryftal: the pebble-emeralds are always the hardeft and brighteft, but are feldom found exceeding the fize of a pea: the cryftalliform ones grow feveral together, and are often larger: the pebble-kind are found loofe in the earths of mountains, and fands of rivers; the columnar are found ufually bedded in, or adhering to, a white, opake, and coarfe cryftalline mafs, and fometimes to the jafper, or the prafius.

The oriental emerald is of the hardnefs of the fapphire and ruby, and is fecond only to the diamond in luftre and brightnefs: the american is of the hardnefs of the garnet, and the european fomewhat fofter than that, yet confiderably harder than cryftal: but the coloured cryftals, ufually fold under the name of emeralds, have much debafed the credit of this gem. It lofes its colour in the fire, and becomes undiftinguifhable from the white fapphire.

The oriental emeralds are very fcarce, and at prefent found only in the kingdom of Cambay; very few of them have of late been imported into Europe, infomuch that it has been fuppofed there were no oriental emeralds; but within thefe few years, fome have been brought from Cambay into Italy, that greatly excel the american ones. The american, being what our jewellers call oriental emeralds, are found principally about Peru; and the european, are principally from Silefia.

The medicinal virtues afcribed to this ftone, are, that it ftops hæmorrhages and diarrhœas, and fweetens or obtunds the too acrid humours.

To counterfeit EMERALDS. Take of natural cryftal, four ounces; of red-lead, four ounces; verdigreafe, forty-eight grains; crocus martis, prepared with vinegar, eight grains; let the whole be finely pulverized and fifted; put this into a crucible, leaving one inch empty; lute it well, and put it into a potter's furnace, and let it ftand there as long as they do their pots. When cold, break the crucible, and you will find a matter of a fine emerald colour, which, after it is cut and fet in gold, will furpafs in beauty an oriental emerald.

EMERGENT YEAR, in chronology, the epocha, or date, whence any æra, or method of reckoning time, commences: fuch is the year of the creation of the world, of the birth of our Saviour, &c. See the article EPOCHA.

EMERSION, in aftronomy, is when any planet that is eclipfed begins to emerge or get out of the fhadow of the eclipfing body.

It is alfo ufed when a ftar, before hid by the fun as being too near him, begins to re-appear or emerge out of his rays.

Scruples of EMERSION, an arch of the moon's orbit, which the moon's center paffes over from the time fhe begins to emerge out of the fhadow of the earth, to the end of the eclipfe. See the article ECLIPSE.

EMERY, in natural hiftory, a rich iron-ore found in large maffes of no determinate fhape, or fize, extremely hard, and very heavy. It is ufually of a dufky brownifh-red on the furface, but when broken, is of a fine, bright, iron-grey, but not without fome tinge of rednefs, and is fpangled all over with fhining fpecks, which are fmall flakes of a foliaceous talc, highly impregnated with iron. It is alfo fometimes very red, and then ufually contains veins of gold. It makes no effervefcence with any of the acid menftruums, and is found in the ifland of Guernfey, in Tufcany, and many parts of Germany.

Emery is faid to have a corroding and almoft cauftic quality, but this without any juft foundation. It is recommended by the antients as an aftringent and dentifrice. In this laft intention, however, it muft be ufed with great caution, as its hardnefs and fharpnefs will be apt to wear off the enamel of the teeth.

Emery is prepared by grinding in mills, and the powder is feparated into parcels of different degrees of finenefs by wafhing; thefe are called the firft, fecond, and third fort; the firft being that which remains longeft fufpended in water, the others, fuch as fink fooner from the fame liquor, and from which it is poured, while yet turbid, to fettle for the finer kind. Thefe feveral forts are of great ufe to various artificers in polifhing and burnifhing iron and fteel works, marble, cutting and fcolloping glafs, &c. The lapidaries cut the ordinary gems on their wheels,

wheels, by ſprinkling the wetted powder over them, the wheels they uſe being uſually of lead, with a ſmall admixture of pewter, that their ſoftneſs may admit the emery the better. It will not cut diamonds.

The red emery of Peru is in great eſteem with thoſe who ſeek after the philoſopher's ſtone: but the king of Spain ſuffers none of it to be exported.

Putty of EMERY, a kind of dirty matter found on the lapidaries wheels, containing part of the powder of emery.

EMETIC, a medicine which induces vomiting. Emetics and purges are ſo much alike in their operations, that one cannot be well apprehended without the other. Thus much, therefore, is common to them both, that any medicine which ſo far vellicates the membranes and coats of the ſtomach and bowels as to draw them into convulſive twitches, or much accelerate their natural motions, will be emetic or cathartic, and ſometimes both. But the action of vomiting is more properly a convulſive motion in the ſtomach than in the bowels. Whatſoever, therefore, ſo irritates the fibres of the ſtomach as to make them contract with great force, will throw its contents upwards, the vent being much larger that way than through the pylorus, which would ſend them down by ſtool. The difference, therefore, between an emetic and a cathartic, lies only in this, that the latter conſiſts of ſuch particles as paſs the ſtomach without any violent vellications of the fibres, and the former, of ſuch as have that effect almoſt as ſoon as they come there, ſo that an emetic ſeems ſtronger than a cathartic; and this is the reaſon why a cathartic in an increaſed doſe will prove emetic. Some are of opinion, that the ſubſtance itſelf which procures a vomit, is thrown up again in the firſt or ſecond ejection; and that the following ſolicitations are cauſed by the acrimony of the juices which the firſt motions pumped, as it were, and occaſioned to drain into the ſtomach. Be that as it will, it is certain that the action of vomiting, gives the ſtrongeſt ſhakes to all the muſcles and ſolids of the body that any motion can give; and that the laſt reachings generally diſcover a drain of humours derived into the ſtomach from ſome conſiderable diſtance. The ſervice to be expected from emetics, is not ſo much, therefore, what they diſcharge upwards, as what their violent emotions and concuſſions render fit for ſeparation, and force through the ſkin and other outlets.

Tinctures, extracts, and reſins, are always obſerved to operate rougher this way than more ſimple preparations; and the reaſon ſeems to be, that ſuch management of an ingredient, divides its parts too much, and makes them come too intimately into contact with the fibres; whence they are not ſo ſoon ſhaken off by their convulſive twitchings, as more groſs parts might be. Upon this account, therefore, moſt of the ſimples which come under this head, are beſt ordered in their natural forms; and the elaborate preparations of the chemical pharmacy eſpecially, produce no emetic ſo good as we find amongſt nature's own productions. Sydenham lays it down as a rule, that whenever a vomit and bleeding are neceſſary, bleeding ſhould always precede the exhibition of an emetic. Dr. Harris informs us, that antimonial vomits are very ſafe in the heat of the ſummer, but are very dangerous in the cold of the winter. When emetics are too violent, common ſalt is uſed to check their operation. Mild aromatics and opiates alſo have the ſame effect, and corroborating medicines whether taken internally, or applied by way of cataplaſm to the region of the ſtomach. The infuſion of ipecacuanha in wine, according to Dr. Shaw, is the moſt ſafe, gentle, and agreeable emetic hitherto known; whence, ſays he, it may in moſt caſes be properly ſubſtituted for the vinum benedictum, the tartarum emeticum, and all the other antimonial emetics, which are attended with ſome degree of virulency and uncertainty in their operation.

EMETIC TARTAR. } See { TARTAR.
EMETIC POWDER. } See { ALGAROT.
EMETIC WINE. } See { VINUM.

EMEU, in ornithology, the ſame with the caſſowary. See CASSOWARY.

EMINENCE, a title of honour peculiar to cardinals. See the article CARDINAL.

EMINENCE, in the military art, a high or riſing ground, which overlooks and commands the low places about it: ſuch places within cannon ſhot of a fort, are a great diſadvantage; for if the beſiegers become maſters of them, they can, from thence, fire into the fort.

EMINENTIAL EQUATION, an artificial equation, containing another equation eminently: it is ſometimes uſed in the inveſtigation of the areas of curvelined figures. See EQUATION.

EMINENTLY, *eminenter*, a term uſed in the ſchools in regard to things which poſſeſs ſome quality or virtue in a high degree.

EMIR, a title of dignity among the Turks, ſignifying a prince.

This title was firſt given to the caliphs, but when they aſſumed the title of ſultans, that of emir remained to their children, as that of Cæſar among the Romans. At length the title became attributed to all who were judged to deſcend from Mahomet by his daughter Fatimah, and who wear the green turban inſtead of the white. The Turks make an obſervation, that the emirs, before their fortieth year, are men of the greateſt gravity, learning, and wiſdom; but after this, if they are not great fools, they diſcover ſome ſigns of levity and ſtupidity. This is interpreted by the Turks as a ſort of divine impulſe in token of their birth and ſanctity. The Turks alſo call the viziers, baſhaws, or governors of provinces, by this name.

EMISSARY, in a political ſenſe, a perſon employed by another to ſound the opinions of people, ſpread certain reports, or act as a ſpy over other people's actions. See the article SPY.

EMISSARY VESSELS, in anatomy, the ſame with thoſe more commonly called excretory. See the article EXCRETORY.

EMISSION, in medicine, a term uſed chiefly to denote the ejaculation of the ſemen, or ſeed, in the act of coition. See COITION and GENERATION.

EMMENAGOGUES, in pharmacy, medicines which promote the menſes, or monthly courſes, either by giving a greater force to the blood in its circulation, whereby its momentum againſt the veſſels is increaſed; or by making it thinner, whereby it will more eaſily paſs through any outlet. The former intention is helped by chalybeates, and other ſubſtances of the like gravity and elaſticity: and this is the caſe of a leuco-phlegmatic habit, or the green-ſickneſs, and its cure: but in the latter caſe, where the blood is florid and too high, attenuating alteratives and detergents are the only remedies, becauſe they are fitteſt to carry the blood through theſe little apertures deſtined for its diſcharge into the uterus.

Obſtructions are removed by the five aperient roots, birthwort, rhubarb, bryony, and wall-flowers, eſpecially if exhibited by way of decoction with ſome ſtimulus of the ſaline kind, ſuch as borax.

EMMERIC, a city of Weſtphalia, in Germany, ſubject to Pruſſia: eaſt long. 5° 45′, north lat. 51° 48′.

EMOLLIENTS, in medicine and pharmacy, are ſuch remedies as ſheath and ſoften the aſperity of the humours, and relax and ſupple the ſolids at the ſame time. It is very eaſy to conceive how both theſe are brought about by the ſame medicine. By what means ſoever, whether in the ſtomach or any other parts, the juices have obtained a ſharpneſs and aſperity, ſo as to vellicate and render uneaſy the fibres and nervous parts, which often happens, thoſe things that are ſmooth, ſoft, and yielding, cannot but wrap up their points, and render them imperceptible, whence they may gradually, by the proper courſe of circulation, be brought to ſome convenient emunctory, without doing any injury by the way. Such parts likewiſe draw the fibres into ſpaſms, keeping them too tenſe, and thereby frequently occaſion obſtructions of the worſt kind. In all ſuch caſes, emollients lubricate and moiſten the fibres, ſo as to relax them into their proper dimenſions, whereupon ſuch diſorders ceaſe.

The chief of the emollient and ſoftening remedies, are the roots of marſh-mallow, of white lilies, of liquorice, and of viper's graſs; the five emollient herbs, lettice, bear's breech, pellitory of the wall, the flowers of elder, of melilot, of mallows, of mullein, of yarrow, of chamæmile, of white lilies, of borrage, of the wild popy, of the lime tree, of the egyptian thorn, of violets, and, moſt of all, ſaffron; the ſeeds of flax, of fenugreek, of aniſe, of quinces, of fleabane, of white poppies; of the four greater and leſſer cold-ſeeds, the ſiliqua, ſweet almonds, figs, pine-nuts, piſtaches, cherry-tree gum, gum arabic, gum tragacanth, ſhavings and jelly of hartſhorn, human greaſe, that of a dog, of a capon, the marrows of their bones, the fat about their omentum, bones, and meſentery; the native oils of animals, freſh butter, cream, milk itſelf, cryſtals of milk, ſpermaceti, honey, the yolk of an egg, and its white dried and reduced to a powder. Of the prepared medicines, oil of ſweet almonds, linſeed-oil, rape-oil, oil of the male balſam apple, decoctions of hartſhorn and viper's graſs, mixed with the juice of citrons, the ptiſan, ſweet whey, Fernelius's ſyrup of marſh-mallows, ointment of marſh-mallows, ſimple diachylon plaſter,

ster, that of melilot, and that of frog's spawn. See EPICERASTICS.

EMPALEMENT, an antient kind of punishment, which consisted in thrusting a stake up the fundament.

EMPALEMENT *of a flower*, among herbalists, the same with calyx. See CALYX.

EMPANELLING, or IMPANELLING, in law. See the article IMPANELLING.

EMPARLANCE, or IMPARLANCE, in law. See the article IMPARLANCE.

EMPASTING, or IMPASTING, in painting, is the laying on of colours thick and bold, or the applying several lays of colours, so as they may appear thick.

The term is also used when the colours are laid distinct and asunder, and not softened or lost in each other. See the article COLOURING.

EMPERESS, or EMPRESS, denotes either the wife of an emperor, or a woman who governs singly an empire, in her own right. See EMPEROR and EMPIRE.

EMPEROR, *imperator*, a title of honour among the antient Romans, conferred on a general who had been victorious, and now made to signify a sovereign prince, or supreme ruler of an empire.

The title of emperor adds nothing to the rights of sovereignty; it only gives preheminence above other sovereigns. The emperors, however, pretend, that the imperial dignity is more eminent than the regal. It is disputed whether emperors have the power of disposing of the regal title; however this may be, they have sometimes taken upon them to erect kingdoms: thus it is that Bohemia, Prussia, and Poland, are said to have been raised to that dignity. In the East, the title of emperor is more frequent than with us; thus the sovereign princes of China, Mogul, &c. are called emperors. In the West, the title has been a long time restrained to the emperors of Germany. The first who bore it was Charlemagne, who was crowned by pope Leo III. in 800. And it is to be observed, that there was not a foot of land or territory annexed to the emperor's title.

In the year 1723, the czar of Muscovy assumed the title of emperor of all the Russia's. The kings of France were also called emperors, when they reigned with their sons, whom they associated in the crown: thus Hugh Capet was called emperor, and his son Robert, king. The kings of England were antiently stiled emperors, as appears from a charter of king Edgar.

The emperor of Germany is a limited monarch in regard to the empire, though he is an absolute sovereign in most of his hereditary dominions; the late emperors of the austrian family, having hereditary dominions, enumerated all of them in their title. Charles VI. was stiled emperor of the Romans, always august, king of Bohemia and Hungary, archduke of Austria, &c. but the present empress inheriting those countries, her consort enjoys only the title of emperor of the Romans, duke of Lorrain and Tuscany. The emperor creates dukes, marquisses, and other noblemen; and he appoints most of the officers, civil and military, in the empire: he is elected by the nine electors; and he summons the general diet of the empire. See ELECTOR and DIET.

The emperor of Russia is an absolute hereditary monarch.

EMPETRUM, BERRY-BEARING-HEATH, in botany, a genus of the trioecia-polygamia class of plants, the flower of which consists of three petals, of an oval-oblong figure: the stamina are three very long capillary filaments: the fruit is a globose, depressed, and unilocular berry, containing nine seeds, gibbous on one side, and angulated on the other.

EMPHASIS, in rhetoric, a particular stress of the voice and action, laid on such parts or words of the oration, as the orator wants to enforce upon his audience. See the article ACCENT.

EMPHEREPYRA, in mineralogy, a genus of siderochita, composed of various coats surrounding a nucleus of the same substance and structure with themselves. See the article SIDEROCHITA.

Of this genus there are several species, distinguished by the different colours of their coats or crusts, as brown, yellow, purple, green, white, &c.

EMPHRACTICS, in medicine and pharmacy, obstructing topics, such as, when applied to the body, adhere and stop the pores.

EMPHYSEMA, in surgery, a windy tumour generally occasioned in a fracture of the ribs, and formed by the air insinuating itself, by a small wound, between the skin and muscles, into the substance of the cellular or adipose membrane, spreading itself afterwards up to the neck, head, belly, and other parts, much after the manner in which butchers blow up their veal. See the articles FRACTURE and RIBS.

When

When an emphysema happens, it will be very proper to enlarge the opening in the skin, when too narrow, with the scalpel, and to bring down the tumour with frictions and bandage; carrying the compression gradually towards the opening, so as to expel the included air by degrees. Emphysema, in Hippocrates, imports an inflation of the belly, and sometimes a tumour in general. It is surprising to what degree the cellular membrane will be inflated by the air retained and rarefied in its cells. To this purpose Mr. Mery gives a very remarkable history in the memoirs of the royal academy of sciences for 1713, which the curious may consult.

EMPHYTEUSIS, in the civil and canon law, the letting out of poor barren lands for ever, or, at least, for a long term of years, on condition of the tenant's cultivating, meliorating, or mending them, and paying a certain yearly consideration. Emphyteuses are a kind of alienations, differing from sale, in that they only transfer the *dominium utile*, the benefits of the ground, not the property, or simple fee. Among the Romans, they were at first temporary, afterwards perpetual.

EMPIRE, *imperium*, in political geography, a large extent of land, under the jurisdiction or government of an emperor. See the article EMPEROR.

The most antient empire we read of, is that of the Assyrian, which was subverted though the effeminacy of Sardanapalus; the persian empire was destroyed through the bad conduct of Darius Codomannus; the grecian empire, by its being dismembered among the captains of Alexander the great; and the roman empire, through the ill management of the last emperors of Rome.

Empire, or the empire, used absolutely, and without any addition, signifies the empire of Germany, called also in juridical acts and laws, the holy roman empire. Authors are at a loss under what form of government to range the empire: some will have it a monarchical state, by reason all the members thereof are forced to ask the investiture of their states of the emperor, and to take an oath of fidelity to him. Others will have it an aristocratic state, by reason the emperor cannot determine any thing without the concurrence of the princes: and, lastly, others will have the empire to be a monarcho-aristocratic state. See ELECTOR, DIET, CIRCLE, &c.

EMPIRIC, an appellation given to those physicians who conduct themselves wholly by their own experience, without studying physic in a regular way. Some even use the term, in a still worse sense, for a quack who prescribes at random, without being at all acquainted with the principles of the art.

EMPLASTER, *emplastrum*, in pharmacy, the same with plaster. See PLASTER.

EMPLASTICS, the same with emphractics. See the article EMPHRACTICS.

EMPRESS, or EMPERESS. See the article EMPERESS.

EMPROSTHOTONOS, a species of convulsion, wherein the chin presses against the breast. See CONVULSION.

EMPYEMA, in medicine, a disorder wherein purulent matter is contained in the thorax or breast, after an inflammation and suppuration of the lungs and pleura; which, if it be not timely discharged, not only obstructs respiration, but also returning into the blood occasions a continual hectic, with a consumption of the whole body, and other bad symptoms.

In order to discharge this matter, or blood extravasated into the cavity of the thorax, in wounds of that part, it must be perforated; which operation is called paracentesis. See PARACENTESIS.

After the affected side is opened, the pus must be drawn off slowly, and at several times; and the cavity is to be cleansed by injections of decoctions with honey: which done, the wound is to be healed, giving at the same time plenty of vulnerary decoctions inwardly, of such things as deterge and resist putrefaction. See the article ANTISCEPTICS.

EMPYREUM, a term used by divines for the highest heaven, where the blessed enjoy the beatific vision.

Some of the fathers suppose the empyreum to have been created before the heavens which we behold. See HEAVEN.

EMPYREUMA, among chemists and physicians, the fiery taste or offensive smell which brandies, and other bodies prepared by fire, are impregnated with. See DISTILLATION and BRANDY.

EMRODS, or HÆMORRHOIDS. See the article HÆMORRHOIDS.

EMULGENT, or RENAL ARTERIES, those which supply the kidneys with blood; being sometimes single, sometimes double on each side. See ARTERY.

EMULSION, in pharmacy, a soft liquid remedy, of a colour and consistence resembling milk. It is composed by draw-

ing out the oily or milky part of feeds or kernels by contufion, with proper liquors. Emulfions, if carefully made, are a very neat form, but a very fmall part of the materia medica is reducible thereinto, or only thofe feeds which yield a foft milky juice; and therefore the only intention which this form can properly be prefcribed for, is that of an emollient, tho' fome few are given for other purpofes, but they are not fo fuitable: oils, likewife, may, by the help of an egg, and a little of any of the turpentine balfams, be reduced under this head, and, if well managed, will make an elegant medicine. In all emulfions the feeds are to be hufked or blanched, and beat in the mortar to a pafte: then the liquors ordered are to be put in by a little at a time at firft, and beat with the mafs, fo that the whole pulp may be wafhed out, and nothing but a little like chaff be left behind: this is always to be done in a marble mortar, and with a wooden peftle.

EMUNCTORY, in anatomy, a general term for all thofe parts which ferve to carry off the excrementitious parts of the blood and other humours of the body. Such more efpecially are the kidneys, bladder, and moft of the glands. See the articles KIDNEYS, BLADDER, *&c.*

ENÆMON, ἐναιμον, in medicine, an epithet often applied by Hippocrates and Galen, to fuch topical medicines as are appropriated to a wound newly inflicted, before the blood be ftopped.

ENÆOREMA, in medicine, that pendulous fubftance which floats in the urine. It is alfo called fublimamentum and nubeculæ, from its refemblance to little clouds. See the article URINE.

ENALLAGE, in grammar, is when one word is fubftituted for another of the fame part of fpeech: a fubftantive for an adjective, as *exercitus victor*, for *victoriofus*; *fcelus*, for *fcelefius*: a primitive for a derivative, as *dardana arma*, for *dardania*; *laticem lyæum*, for *lyæeium*: an active for a paffive, as *nox humida cælo præcipitat*, for *præcipitatur*, &c.

ENALLAGE, in rhetoric, is a figure whereby the difcourfe is changed and reverfed contrary to all the rules of the language; but this is not done altogether at pleafure, or without reafon.

ENALURON, in heraldry, is, according to Guillim, a bordure charged with birds; though others will have it to fignify, in orle, or form of a bordure. See the article BORDURE.

ENAMEL, a kind of coloured glafs, ufed in enamelling and painting in enamel. Enamels have for their bafis a pure cryftal glafs or frit, ground up with a fine calx of lead and tin prepared for the purpofe, with the addition ufually of white falt of tartar. Thefe ingredients baked together, are the matter of all enamels, which are made by adding colours of this or that kind in powder to this matter, and melting or incorporating them together in a furnace.

For white enamel, Neri De Arte Vitriar, directs only manganefe to be added to the matter which conftitutes the bafis. For azure, zaffer mixed with calx of brafs. For green, calx of brafs with fcales of iron, or with crocus martis. For black, zaffer with manganefe, or with crocus martis; or manganefe with tartar. For red, manganefe or calx of copper and red tartar. For purple, manganefe with calx of brafs. For yellow, tartar and manganefe. And for violet-coloured enamel, manganefe with thrice calcined brafs.

In making thefe enamels, the following general cautions are neceffary to be obferved. 1. That the pots muft be glazed with white glafs, and muft be fuch as will bear the fire. 2. That the matter of enamels muft be very nicely mixed with the colours. 3. When the enamel is good, and the colour well incorporated, it muft be taken from the fire with a pair of tongs. 4. The general way of making the coloured enamels is this: powder, fift, and grind all the colours very nicely, and firft mix them with one another, and then with the common matter of enamels; then fet them in pots in a furnace, and when they are well mixed and incorporated, caft them into water; and when dry, fet them in a furnace again to melt; and when melted, take a proof of it. If too deep-coloured, add more of the common matter of enamels; and if too pale, add more of the colours.

Enamels are ufed either in counterfeiting or imitating precious ftones, in painting in enamel, or by enamellers, jewellers, and goldfmiths, in gold, filvers and other metals. The two firft kinds are ufually prepared by the workmen themfelves, who are employed in thefe arts. That ufed by jewellers, *&c.* is brought to us chiefly from Venice or Holland, in little cakes of different fizes, commonly about four inches diameter, having the mark of the

the maker ſtruck upon it with a puncheon. It pays the pound 1 s. $7\frac{41}{100}$d. on importation, and draws back 1 s. $5\frac{70}{100}$d. at the rate of 4 s. *per* pound.

ENAMELLING, the art of laying enamel upon metals, as gold, ſilver, copper, *&c.* and of melting it at the fire, or of making divers curious works in it at a lamp. It ſignifies alſo to paint in enamel.

The method of painting in enamel. This is performed on plates of gold or ſilver, and moſt commonly of copper, enamelled with the white enamel; whereon they paint with colours which are melted in the fire, where they take a brightneſs and luſtre like that of glaſs. This painting is the moſt prized of all for its peculiar brightneſs and vivacity, which is very permanent, the force of its colours not being effaced or ſullied with time, as in other painting, and continuing always as freſh as when it came out of the workman's hands. It is uſual in miniature, it being the more difficult the larger it is, by reaſon of certain accidents it is liable to in the operation. Enamelling ſhould only be practiſed on plates of gold, the other metals being leſs pure: copper, for inſtance, ſcales with the application, and yields fumes; and ſilver turns the yellows white. Nor muſt the plate be made flat; for in ſuch caſe, the enamel cracks; to avoid which, they uſually forge them a little round or oval, and not too thick. The plate being well and evenly forged, they uſually begin the operation by laying on a couch of white enamel (as we obſerved above) on both ſides, which prevents the metal from ſwelling and bliſtering; and this firſt lay ſerves for the ground of all the other colours. The plate being thus prepared, they begin at firſt by drawing out exactly the ſubject to be painted with red vitriol, mixed with oil of ſpike, marking all parts of the deſign very lightly with a ſmall pencil. After this, the colours (which are to be before ground with water in a mortar of agate extremely fine, and mixed with oil of ſpike ſomewhat thick) are to be laid on, obſerving the mixtures and colours that agree to the different parts of the ſubject; for which it is neceſſary to underſtand painting in miniature. But here the workman muſt be very cautious of the good or bad qualities of the oil of ſpike he employs to mix his colours with, for it is very ſubject to adulterations. See OIL. Great care muſt likewiſe be taken, that the leaſt duſt imaginable come not to your colours while you are either painting or grinding them; for the leaſt ſpeck, when it is worked up with it, and when the work comes to be put into the reverberatory to be red hot, will leave a hole, and ſo deface the work.

When the colours are all laid, the painting muſt be gently dried over a ſlow fire to evaporate the oil, and the colours afterwards melted to incorporate them with the enamel, making the plate red hot in a fire, like what the enamellers uſe. Afterwards that part of the painting muſt be paſſed over again which the fire hath any thing effaced, ſtrengthening the ſhades and colours, and committing it again to the fire, obſerving the ſame method as before, which is to be repeated till the work is finiſhed.

Method of ENAMELLING *by the lamp.* Moſt enamelled works are wrought at the fire of a lamp, in which, inſtead of oil, they put melted horſe-greaſe, which they call caballine oil. The lamp, which is of copper or white iron, conſiſts of two pieces, in one of which is a kind of oval plate, ſix inches long, and two high, in which they put the oil and the cotton. The other part, called the box, in which the lamp is incloſed, ſerves only to receive the oil which boils over by the force of the fire. This lamp, or where ſeveral artiſts work together, two or three more lamps are placed on a table of proper heighth. Under the table, about the middle of its height, is a double pair of organ-bellows, which one of the workmen moves up and down with his foot, to quicken the flame of the lamps, which are by this means excited to an incredible degree of vehemence. Grooves made with a gauge in the upper part of the table, and covered with parchment, convey the wind of the bellows to a pipe of glaſs before each lamp; and that the enamellers may not be incommoded with the heat of the lamp, every pipe is covered at ſix inches diſtance with a little tin plate, fixed into the table by a wooden handle. When the works do not require a long blaſt, they only uſe a glaſs-pipe, into which they blow with their mouth.

It is incredible to what a degree of fineneſs and delicacy the threads of enamel may be drawn at the lamp. Thoſe which are uſed in making falſe tufts of feathers are ſo fine, that they may be wound on the reel like ſilk or thread. The ficti-

tious jets of all colours, ufed in embroideries, are alfo made of enamel; and that with fo much art, that every fmall piece hath its hole to pafs the thread through wherewith it is fewed. Thefe holes are made by blowing them into long pieces, which they afterwards cut with a proper tool.

It is feldom that the venetian or dutch enamels are ufed alone; they commonly melt them in an iron-ladle, with an equal part glafs or cryftal; and when the two matters are in perfect fufion, they draw it out into threads of different fizes, according to the nature of the work. They take it out of the ladle while liquid, with two pieces of broken tobacco pipes, which they extend from each other at arm's length. If the thread is required ftill longer, then another workman holds one end, and continues to draw it out, while the firft holds the enamel to the flame. Thofe threads, when cold, are cut into what lengths the workman thinks fit, but commonly from ten to eleven inches; and as they are all round, if they are required to be flat, they muft be drawn through a pair of pincers while yet hot. They have alfo another iron-inftrument in form of pincers, to draw out the enamel by the lamp when it is to be worked or difpofed in figures. Laftly, they have glafs-tubes of various fizes, ferving to blow the enamel into various figures, and preferve the neceffary vacancies therein; as alfo to fpare the ftuff and form the contours. When the enameller is at work, he fits before his lamp with his foot on the ftep that moves on the bellows, and holding in his left hand the work to be enamelled, or the brafs or iron-wires the figures are to be formed on, he directs with his right the enamel thread, which he holds to the flame with a management and patience equally furprifing. There are few things they cannot make or reprefent with enamel; and fome figures are as well finifhed, as if done by the moft fkilful carvers.

ENARTHROSIS, in anatomy, a fpecies of diarthrofis. See DIARTHROSIS.

ENCÆNIA, the name of three feveral feafts celebrated by the Jews in memory of the dedication, or rather purification, of the temple, by Judas Maccabeus, Solomon, and Zorababel.

This term is likewife ufed in church-hiftory for the dedication of chriftian churches.

ENCAMPMENT, the pitching of a camp. See the article CAMP.

ENCANTHIS, in furgery, a tubercle arifing either from the caruncula lachrymalis, or from the adjacent red fkin, in the great canthus, or angle of the eye, fometimes fo large, as to obftruct not only the puncta lachrymalia, but alfo part of the fight, or pupil itfelf. See EYE.

In this diforder, the tears continually run down the cheek, which greatly deforms the eye and face.

It is of two kinds, *viz.* mild, without hardnefs or pain; or malignant, which is livid and very painful. The mild kind is to be treated firft by fcarifying, and afterwards applying efcharotic or cauftic medicines; and if this proves infufficient, the tumour may be touched, but with great caution, with lapis infernalis; and to divert the humours from the eye, iffues and fetons, with phlebotomy and cooling purges, are proper. If all thefe fail, the furgeon is to extirpate the tumour; in which cafe, it is better to leave part of the morbid tubercle, than cut off any part of the lachrymal caruncle, as the remains of it may be afterwards cleared away by efcharotics. After the operation, it is proper to apply deterging and healing medicines, or a collyrium of lapis tutiæ, myrrh, &c. till the wound is healed.

As to the malignant encanthis, inclining to be cancerous, it is generally better to let it alone, and to mitigate its uneafinefs with cooling and lenient collyria, rather than exafperate it by the operation, or by efcharotic medicines.

ENCAUSTICE and ENCAUSTUM, the fame with enamelling and enamel. See ENAMELLING and ENAMEL.

ENCEINTE, in fortification, is the wall or rampart which furrounds a place, fometimes compofed of baftions or curtains, either faced or lined with brick or ftone, or only made of earth. The enceinte is fometimes only flanked by round or fquare towers, which is called a roman wall.

ENCEPHALI, in medicine, worms generated in the head, where they caufe fo great a pain, as fometimes to occafion diftraction.

The encephali are very rare, but there are fome difeafes wherein they fwarm; from whence we are told peftilential fevers have wholly arifen. Upon the diffection of one who died of this fever, a little, fhort, red worm was found in the head,

head, which malmfey wine, wherein horfe-radifh had been boiled, could only deftroy. This medicine was afterwards tried on the fick, moft of whom it cured. The like worms have alfo been taken out by trepanning, and the patient cured. Thofe worms that generate in the nofe, ears, and teeth, are alfo called encephali.

ENCEPPE', in heraldry, denotes fettered, chained, or girt about the middle, as is ufual with monkeys.

ENCHANTER, a perfon fuppofed to practife enchantment, or fafcination. See FASCINATION, WITCHCRAFT, &c.

ENCHANTER'S NIGHTSHADE, in botany. See the article CIRCÆA.

ENCHASING, INCHASING, or CHASING, the art of enriching and beautifying gold, filver, and other metal-work, by fome defign, or figures reprefented thereon, in low relievo. See the articles RELIEVO and SCULPTURE.

Enchafing is practifed only on hollow thin works, as watch-cafes, cane-heads, tweezer cafes, or the like. It is performed by punching or driving out the metal, to form the figure, from within fide, fo as to ftand out prominent from the plane or furface of the metal. In order to this, they provide a number of fine fteel-blocks, or punchions, of divers fizes; and the defign being drawn on the furface of the metal, they apply the infide upon the heads or tops of thefe blocks, directly under the lines or parts of the figures; then, with a fine hammer, ftriking on the metal, fuftained by the block, the metal yields, and the block makes an indenture, or cavity, on the infide, correfponding to which there is a prominence on the outfide, which is to ftand for that part of the figure.

Thus the workman proceeds to chafe and finifh all the parts by fucceffive application of the block and hammer, to the feveral parts of the defign. And it is wonderful to confider with what beauty and juftnefs, by this fimple piece of mechanifm, the artifts in this kind will reprefent foliages, grotefques, animals, hiftories, &c.

ENCHELYS, εγχελυς, the EEL, in ichthyology. See the article EEL. Hence

ENCHELIDES is ufed to denote the capillary eels, difcovered by the help of microfcopes in pepper-watter, and the like. They are a genus of that clafs of animalcules, called gymnia, have no vifible limbs or tails, and are of a cylindric figure; they are only vifible by the help of very powerful glaffes.

ENCLAVE', in heraldry, denotes a thing's being let into another, efpecially when the piece, fo let in, is fquare.

ENCLITICA, in grammar, particles which are fo clofely united with other words, as to feem part of them, as in *virumque*, &c.

There are three enclitic particles in latin, viz. *que*, *ne*, *ve*: but there are a great many in the greek, as τυ, τε, μυ, μοι, συ, σοι, &c.

ENCRASICHOLUS, or ENGRAULIS, the ANCHOVY, in ichthyology. See the article ANCHOVY.

ENCRATITES, *encratitæ*, in church-hiftory, heretics who appeared towards the end of the fecond century: they were called encratites, or continentes, becaufe they gloried in abftaining from marriage, and the ufe of wine and animal food. Their chaftity, however, was a little fufpected, on account of their ufing all forts of means to draw women into their fect, and always keeping company with them.

ENCYCLOPÆDIA, εγκυκλοπαιδεια, in literary hiftory, the fame with cyclopædia. See CYCLOPÆDIA and DICTIONARY.

ENCYSTED TUMOUR. See the articles TUMOUR and CYST.

END FOR END, in the fea-language, is faid of a rope that has run quite out of the block, wherein it was reeved.

ENDECAGON, in geometry, the fame with hendecagon. See HENDECAGON.

ENDEMIC, or ENDEMICAL DISEASES, thofe to which the inhabitants of particular countries are fubject more than others, on account of the air, water, fituation, and manner of living. See the article DISEASE.

It has been always obferved, that people of particular countries were peculiarly fubject to particular difeafes, which are owing to their manner of living, or to the air and effluvia of the earth and water. Hoffman has made curious obfervations on difeafes of this kind: he obferves, that the Laplanders have often diftempers of the eyes, which is owing to their living in fmoke, or being blinded with the fnow; that pleurifies and inflammation of the lungs are alfo very frequent among them; and that the fmall-pox often rages there with great violence: he obferves alfo, that fwellings of the throat have always been common to the inhabitants

tants of mountainous countries; and the old roman authors say, Who wonders at a swelled throat in the Alps? the people of Carinthia, Styria, the Hartz-forest, Transylvania, and the inhabitants of Cronstrad, he observes, are all subject to this disease, from the same cause: and it seems that these strumous swellings are owing to the water which they drink, and which, in mountainous places, is usually very much impregnated with sparry or stony particles. The French are peculiarly troubled with fevers, with worms, and with hydroceles, and sarcoceles; and all these disorders seem to be owing originally to their eating very large quantities of chesnuts. The people of our own nation are peculiarly afflicted with hoarsenesses, catarrhs, coughs, dysenteries, and consumptions: the women with the fluor albus, or whites; and the children with a disease scarce known elsewhere, which we call the rickets. In different parts of Italy, different diseases reign: at Naples the venereal disease is more common than in any other part of the world: at Venice, people are peculiarly subject to the bleeding piles. At Rome, tertian agues and lethargic distempers are most known: in Tuscany, the epilepsy: in Apulia, burning fevers, pleurisies, and that sort of madness which is attributed to the bite of the tarantula, and which, it is said, is only cured by music. In Spain, apoplexies are common, as also melancholy, hypochondriacal complaints, and bleeding piles. The Dutch are peculiarly subject to the scurvy, and the stone in the kidneys. Denmark, Sweden, Pomerania, and Livonia are all terribly afflicted with the scurvy. The Russians and Tartars are afflicted with ulcers made by the cold, of the same nature with what we call chilblanes: and in Poland and Lithuania there reigns a peculiar disease, called the plica polonica, so terribly painful and offensive, that scarce any thing can be worse. The people of Hungary are very subject to the gout and rheumatism; they are more infested with lice and fleas than any other people in the world; and they have a peculiar disease, which they call cremor. The Germans, in different parts of the empire, are subject to different reigning diseases: in Westphalia they have the peripneumonies and the itch: in Silesia, Franconia, Austria, &c. they are subject to fevers of the burning kind, to hæmorrhages, to the gout, inflammations, and consumptions. In Constantinople the plague always rages. And in the West-indian islands, malignant fevers, and the most terrible colics are frequent.

ENDIVE, *endivia*, in botany, &c. the broad-leaved succory. See Cichorium. Marsigli describes a plant, which he calls sea-endive, from its resemblance to the common garden-endive.

ENDORSE, in heraldry, an ordinary, containing the eighth part of a pale, which Leigh says is only used when a pale is between two of them.

ENDORSED, *endorsé*, in heraldry, is said of things borne back to back, more usually called adossé. See Adossé.

ENDORSEMENT, or Indorsement, in law. See Indorsement.

ENDOWMENT, in law, denotes the settling a dower on a woman; though sometimes it is used figuratively, for settling a provision upon a parson, on the building of a church; or the severing a sufficient portion of tithes for a vicar, when the benefice is appropriated.

ENEMA, in medicine, the same with clyster. See the article Clyster.

ENEMY, in law, an alien or foreigner, who publicly invades the kingdom. Whether enemies come into the realm by themselves, or in company with english traitors, they are only dealt with according to the martial law, and not punished as traitors: yet where a subject of a foreign nation, who lives here under the king's protection, takes up arms against the government, he shall be punished as a traitor.

ENERGUMENS, in church-history, persons supposed to be possessed by the devil, concerning whom there were many regulations among the primitive christians. They were denied baptism, and the eucharist; at least, this was the practice of some churches: and though they were under the care of exorcists, yet it was thought a becoming act of charity to let them have the public prayers of the church, at which they were permitted to be present. See the article Exorcism.

ENERGY, ενεργεια, a term of greek origin, signifying the power, virtue, or efficacy of a thing. It is also used, figuratively, to denote emphasis of speech. See the article Emphasis.

ENFANS perdus, the same with forlorn hope. See the article Forlorn.

ENFILADE, in the art of war, is used in speaking of trenches, or other places, which may be scoured by the enemy's shot,

shot, along their whole length. In conducting the approaches at a siege, care must be taken that the trenches be not enfiladed from any work of the place. See the article TRENCHES.

ENFRANCHISEMENT, in law, the incorporating a person into any society or body politic: thus, where any person is enfranchised, or made free, of any city, borough, or company, he is said to have a freehold therein during life; and cannot, for barely endeavouring any thing against the corporation, forfeit the same. Naturalization is also another kind of enfranchisement. See NATURALIZATION.

ENGASTRIMYTHI, in pagan theology, the pythians, or priestesses of Apollo, who delivered oracles from within, without any action of the mouth or lips. See the article PYTHIA.

The antient philosophers, &c. are divided upon the subject of the engastrimythi. Hippocrates mentions it as a disease. Others will have it a kind of divination. Others attribute it to the operation or possession of an evil spirit. And others to art and mechanism. M. Schottus maintains that the engastrimythi of the antients were poets, who, when the priests could not speak, supplied the defect by explaining in verse what Apollo dictated in the cavity of the bason on the sacred tripod.

ENGENDERING, a term sometimes used for the act of producing or forming any thing: thus meteors are said to be engendered in the middle region of the atmosphere, and worms in the belly. See the articles GENERATION, METEOR, WORM, &c.

ENGERS, the capital of a county of the same name, in Germany, situated on the river Rhine, about seven miles north of Coblentz.

ENGHIEN, a city of Hainault, about fourteen miles south-west of Brussels.

ENGINA, an island on the north east of the Morea, about fifty miles east of Corinth.

ENGINE, in mechanics, is a compound machine, made of one or more mechanical powers, as levers, pullies, screws, &c. in order to raise, cast, or sustain any weight, or produce any effect which could not be easily effected otherwise.

Engines are extremely numerous; some used in war, as the battering-ram, ballista, waggons, chariots, &c. others in trade and manufactures, as cranes, mills, presses, &c. others to measure time, as clocks, watches, &c. and others for the illustration of some branch of science, as the orrery, cometarium, and the like. See *Battering*-RAM, BALLISTA, &c.

In general we may observe, concerning engines, that they consist of one, two, or more of the simple powers variously combined together; that in most of them the axis in peritrochio, the lever, and the screw are the constituent parts; that in all a certain power is applied to produce an effect of much greater moment; and that the greatest effect, or perfection, is when it is set to work with four ninths of that charge which is equivalent to the power, or will but just keep the machine in equilibrio. See the articles MAXIMUM and MECHANICS.

In all machines, the power will just sustain the weight, when they are in the inverse ratio of their distances from the center of motion. See the articles POWER and EQUILIBRIUM.

It being of the utmost importance to diminish the friction of engines, several contrivances have been invented for this purpose. See the article FRICTION.

ENGINE *for extinguishing fires*, a machine for raising a considerable quantity of water, in one continued stream, for the extinguishing accidental fires.

The best engine of this kind is that of Mr. Newsham, an engine-maker of London, which is so contrived that part of the men who work it exert their strength by treading, the very best way of working such engines; the whole weight of the body being successively thrown on the force of the pumps, and even part of a man's strength may be added to the weight, by means of horizontal pieces, to which he may apply his hands when treading. This is the reason why, with the same number of men, his engine will throw water farther, higher, and in greater quantities than any engines of the same size, hitherto contrived. See a perspective view of the whole engine, ready for working, in plate LXXXIX. n° 1.

The nature and effect of this engine will be easily understood from a perpendicular section of it represented *ibid.* n° 2. The water is raised by the pressure of the atmosphere, by the force of the pistons, and by the spring of condensed air, in the following manner: thus, when the piston R is raised, a vacuum would be made in the barrel T V, did not the water follow it from the inferior canal L M (through the valve H) which rises through the

glaſs tube E F, immerſed in the water of a veſſel, by the preſſure of the atmoſphere on the ſurface thereof. By the depreſſion of the piſton R, the water in the barrel T V is forced through the ſuperior canal O N, to enter by the valve I, into the air-veſſel *a b c d*; and the like being done alternately by the other barrel W X, and its piſton S, the air-veſſel is by this means continually filling with water, which greatly compreſſes the air above the ſurface of the water in the veſſel, and thereby proportionably augments its ſpring, which is at length ſo far increaſed, as to re-act with great force on the ſurface Y Z of the ſubjacent water; which aſcending through the ſmall tube *e f*, to the ſtop-cock *e g*, is there, upon turning the cock *p*, ſuffered to paſs through a pipe *h*, fixed to a ball and ſocket, from the orifice of which it iſſues with a great velocity, to a very great height or diſtance, in a ſmall continued ſtream, directed every way, or to any particular place, by means of the ball and ſocket.

The greateſt artifice of this engine is its contrivance to produce a continued ſtream, which is done by compreſſion, and the conſequent increaſed elaſticity of the air in the barrel *a b c d*, called the air-veſſel. See the article Air.

When, therefore, the air-veſſel is half filled with water, and the air thereby compreſſed into half its firſt ſpace, its ſpring will be equal to twice the preſſure of the atmoſphere; ſo that, on turning the ſtop-cock *p*, the air within preſſing on the ſubjacent water with twice the force it meets with from the external air in the pipe *e f*, will cauſe the water to ſpout out of the engine to the height of 32 or 33 feet, if the friction be not too great. When the air-veſſel is $\frac{2}{3}$ full of water, the ſpace which the air takes up is only $\frac{1}{3}$ of its firſt ſpace; whence its ſpring being three times as great as that of the common air, it will project the water with twice the force of the atmoſphere, or throw it to the height of 64 or 66 feet. In the ſame manner, when the air-veſſel is $\frac{3}{4}$ full of water, the air will project it to the height of 96 or 99 feet; and when $\frac{4}{5}$ full of water, to the height of 132 feet. Hence it is eaſy to calculate the different heights to which the water will riſe, as in the following table.

Height of the water.	Height of the compreſſed air.	Proportion of the air's ſpring.	Height to which the water will riſe.
$\frac{1}{2}$	$\frac{1}{2}$	2	33 feet.
$\frac{2}{3}$	$\frac{1}{3}$	3	66
$\frac{3}{4}$	$\frac{1}{4}$	4	99
$\frac{4}{5}$	$\frac{1}{5}$	5	132
$\frac{5}{6}$	$\frac{1}{6}$	6	165
$\frac{6}{7}$	$\frac{1}{7}$	7	198
$\frac{7}{8}$	$\frac{1}{8}$	8	231
$\frac{8}{9}$	$\frac{1}{9}$	9	264
$\frac{9}{10}$	$\frac{1}{10}$	10	297

As the air-veſſel is the cauſe of the continued ſtream, we may naturally infer, that if ſuch an air-veſſel were adapted to the common houſe-pump, it would become a uſeful engine for extinguiſhing accidental fires. Now this may be effected in the following or ſome other analogous manner: let A B C D (*ibid.* n° 3.) be the barrel of the pump, P H the rod and piſton, C W the pipe going down to the water of the well at W. Towards the lower part of the barrel is a ſhort tube, by which the air-veſſel F E is fixed to, and communicates with, the barrel of the pump. A M N L is a collar of leather, ſo fixed on the top of the barrel, and adapted to the rod, that it may move freely in the leathers, without permitting the air to paſs in or out between. The nozzle or ſpout D, has a ſtop-cock S, to let out or keep in the water at pleaſure. Q is a piece ſcrewed on, to direct the ſtream, by a ſmall leather-pipe at the end. When the piſton is raiſed from the bottom of the pump-barrel, the water above will be forced into the air-veſſel, and there compreſs the air; it will alſo compreſs the air on the top of the barrel, for the water will not be higher than the ſpout D at firſt, when the ſtop-cock is ſhut; but afterwards, as the air is confined, it will be compreſſed at top, the water riſing to I. This compreſſed air, in each place, will act upon the water by its ſpring, and, upon turning the ſtop-cock, will force it out in a continued ſtream thro' the pipe at Q, and that with a greater or leſſer degree of force, as occaſion requires, that being abſolutely in the power of the perſon working the pump.

Pile-ENGINE, one contrived for driving piles, whereof there are several kinds. See the article PILE.

The most common and simple engine of this kind, as represented in plate XC. fig. 1. n° 1. consists of the cill K I, and the frame F L, on which are fixed the upright pieces L H and L G, supported by the side braces, C, C, and the hind brace F E (which has pins on it to make it serve as a ladder) and held together by a square collar E D. The rammer A, being a very heavy piece of wood, or iron, slides up and down between the cheeks or upright pieces L H, L G, and is drawn up by means of its hook B, with two ropes H O, G O, having each five smaller ropes with handles at N, N, for ten men to pull up the rammer to a certain height (the great ropes running over two pullies or rollers on the iron-pin H G) and then let it fall again all at once upon the head of the pile at M, to drive it into the ground. Now, suppose the rammer A, weighs 500 ℔, and falls the height of one foot, it will fall that height in a quarter of a second, and consequently have a velocity able to carry it uniformly 2 feet in the same time, that is, at the rate of 8 feet in a second, at the very instant it strikes the pile M. Therefore, measuring the mass by the velocity, *viz.* 500×8 we shall have 4000 for the momentum of the rammer with such a fall. See the article DESCENT. But if the rammer be raised up to the height of four feet, it will fall that height in half a second, and have, at the time of percussion, a velocity to carry it 8 feet in half a second, without any farther help from gravity, so that we must now multiply 16 feet (the present velocity, since it goes at the rate of 16 feet in a second) by 500, the mass of the rammer, which will give us a double momentum, wherewith it will strike the pile in this last case; for 500×16=8000. If we consider any other height from which the rammer falls (for one may employ a capstan, windlass, or pullies to raise it to a very great height) the momentum with which it strikes the pile, will always be as the square root of the height from which the rammer fell.

If a pile is to be driven obliquely, the engine must be set so that the cheeks may have the same obliquity, and the blow will still be perpendicular to the head of the pile; but then the force of the blow must not be estimated from the length, but from the height of the descent, in the manner already shewn.

Mr. Valoué's ENGINE *for driving piles*, used at building Westminster-bridge, is constructed as follows. A (plate XC. n° 2.) is the great shaft, on which are the great wheel and drum: B the great wheel with cogs, that turns a trundle head with a fly, to prevent the horse's falling when the ram is discharged; C the drum on which the great rope is wound; D the follower (with a roller at one corner) in which are contained the tongs, to take hold of the ram, and are fastened to the other end of the great rope, which passes over the pulley, near the upper end of the guides between which the ram falls; E the inclined planes, which serve to open the tongs, and discharge the ram; F the spiral barrel that is fixed to the drum, on which is wound a rope with a counterpoise, to hinder the follower from accelerating, when it falls down to take up the ram; G the great bolt which locks the drum to the great wheel; H the small lever, which has a weight fixed at one end, passes through the great shaft below the great wheel, and always tends to push the great bolt upwards, and lock the drum to the great wheel; I the forcing bar, which passes thro' the hollow axis of the great shaft, bears upon the small lever, and has near the upper end a catch by which the crooked lever keeps it down; K the great lever, which presses down the forcing bar, and discharges the great bolt at the time the long end is lifted up by the follower; L the crooked lever, one end of which has a roller, that is pressed upon by the great rope, the other end bears upon the catch of the forcing bar during the time the follower is descending; M the spring that presses against the crooked lever, and discharges it from the catch of the forcing bar as soon as the great rope slackens and gives liberty to the small lever to push up the bolt.

By the horse's going round, the great rope is wound about the drum, and the ram is drawn up, till the tongs come between the inclined planes, where they are opened, and the ram is discharged.

Immediately after the ram is discharged, the roller, which is at one end of the follower, takes hold of the rope that is fastened to the long end of the great lever, and lifts it up; the other end presses down the forcing bar, unlocks the drum,

and the follower comes down by its own weight.

As foon as the follower touches the ram, the great rope flackens, and the fpring M difcharges the crooked lever from the catch of the forcing bar, and gives liberty to the fmall lever to pufh up the great bolt, and to lock the drum to the great wheel, and the ram is drawn up again as before.

Steam-ENGINE, a machine to raife water by fire, or rather by the force of water turned into fteam.

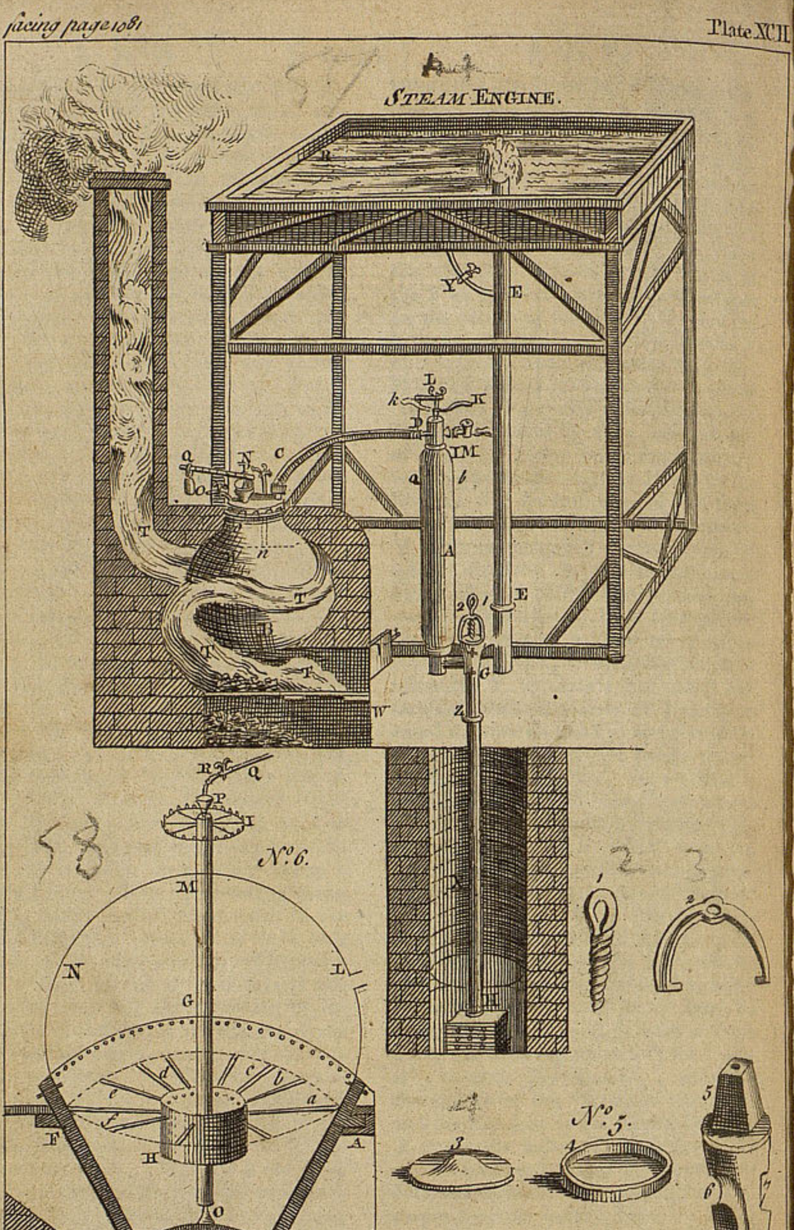
The following is a defcription of this engine in its firft ftate, and original fimplicity. A B C (plate XC. fig. 2.) is a copper-veffel, partly filled with water to D I, which, being fet over a fire and made to boil, will fill the upper part D B E with an elaftic vapour, the fufficient ftrength whereof is known by its forcing open a valve at *e*: this heated elaftic fteam is, by turning a cock at F, let into the barrel *a b c d*, where, by its elaftic force, it raifes the pifton G, which drives the air above it through a proper clack at the top. After this, that the pifton may by its weight defcend, a little cold water from the ciftern *f g h i*, is let in at the bottom by turning a cock at *k*, which, in form of a jet, condenfes the hot fteam in the barrel into 13000 times lefs fpace than before it took up, which make a fufficient vacuum for the pifton to defcend in. The pifton G, and lever H I being thus put into motion, do accordingly raife and deprefs the pifton K in the barrel of the forcing pump L M, on the other fide; which, by the pipe N, draws the water from the depth W, and forces it to rife and fpout through the tube O, continued to any height at pleafure. See the article PUMP.

Thus is the fteam-engine a very fimple and plain machine, where a very powerful ftroke for working of pumps is performed by only turning two cocks alternately; and yet a perfon who knows nothing of it, would imagine it to be very complex, by the number of parts that offer themfelves to view. But here we muft diftinguifh between what performs the material operations of the engine, and what ferves for conveniency and the juft regulation of the faid operations; for not above the hundredth part of the power of this engine is employed to turn the cocks and regulate all the motions, as will appear from what follows.

The ftructure of the fteam-engine, as ufed at prefent, is reprefented in plate XCI. n° 1. concerning which we are to obferve, 1. That there may be always water in the ciftern *g*, to inject into the fteam to condenfe it, there is an arch *x*, fixed near the arch H, at the pump end, from whence another pump-rod *k*, with its pifton, draws water from a fmall ciftern near the mouth of the pit, fupplied from the water raifed at *p*, and forces it up the pipe *m m m*, to keep the injecting ciftern *g* always full. 2. As the pifton C which moves up and down the cylinder ought to be air-tight, a ring of leather, or a piece of match, which lies upon its circumference next to the infide of the cylinder, muft be kept moift and fwelled with water; this is fupplied from the injecting ciftern by a fmall pipe *z*, always running down upon the pifton, but in a very fmall quantity, if the work be well performed. L is a leaden cup, whofe office is to hold the water that lies on the pifton, left it fhould flow over when the pifton is arrived at its greateft height in the cylinder, as W, at which time if the cup is too full, the water will run down the pipe LV, into the wafte-well at Y. 3. As the water, in the boiler B, muft wafte by degrees, as it is conftantly producing fteam, and that fteam continually let out for working the engine, there ought to be a conftant fupply of the water to boil: this is performed by means of the pipe F *f*, about three feet long, going down a foot under the furface of the water in the boiler, with a funnel F, at top, always open, and fupplied by the pipe W, with water from the top of the ciftern, which has the advantage of being always warm, and, therefore, not apt to check the boiling of the water in the copper. 4. That the boiler may not have the furface of the water too low (which would endanger burfting) or too high (which would not leave room enough for fteam) there are two gauge-pipes at G, one going a little below the furface of the water when at a proper height, and the other ftanding a little above it: when every thing is right, the ftop-cock of the fhorter pipe being opened gives only fteam, and that of the long one water; but if otherwife, both cocks will give fteam when the furface is too low, and both give water when it is too high; and hence the cock which feeds the boiler at F may be opened to fuch

ſuch a degree as always to keep the ſurface of water to its due heighth. 5. As cold water is injected into the cylinder at every ſtroke, and as that water might in time fill the cylinder, and hinder the operation of the engine, there is a pipe coming from the bottom of the cylinder *d* T Y, called the eduction pipe, through which the water that has been injected, comes down every time the ſteam is let into the cylinder. This eduction pipe goes an inch or two under water in the waſte well Y, and having its end turned up is ſhut with a valve Y to keep out the air from preſſing up the pipe, but permitting the injected air coming the other way to be diſcharged; by which means the cylinder is kept empty. 6. Leſt the ſteam ſhould grow too ſtrong for the boiler, and burſt it, there is a valve fixed at *b* with a perpendicular wire ſtanding up from the middle of it, to put weights of lead upon, by which to examine the ſtrength of the ſteam puſhing againſt it from within. Thus the ſteam is known to be as ſtrong as the air, if it will raiſe up ſo much weight on the valve as is at the rate of 15 ℔. to an inch ſquare; becauſe that is the weight of the air, nearly, on every inch ſquare. When the ſteam becomes ſtronger than what is required, it will lift up the valve and go out. This valve is called the puppet-clack. 7. The ſteam is always in a fluctuating condition, yet never $\frac{1}{10}$ ſtronger or weaker than common air. For it has been found that the engine will work well, when there is the weight of one pound on every ſquare inch of the valve *b*. This ſhews that the ſteam is then $\frac{1}{15}$ part ſtronger than the common air. Now as the heighth of the feeding pipe from the funnel F to the ſurface of the water S *s* is not above three feet, and $3\frac{1}{2}$ feet of water is $\frac{1}{10}$ of the preſſure of air; if the ſteam were $\frac{1}{10}$ part ſtronger than air, it would puſh the water out at E; which ſince it does not do, it cannot be ſtronger than air, even in this caſe, where the regulator being ſhut, it is moſt of all confined. 8. When the regulator is open, the ſteam gives the piſton a puſh on the underſide, then occupying more ſpace, the ſteam comes to be a balance only for the outward air, and ſo only ſuſtains the piſton; but the over weight of the pump-rods, at the contrary end of the beam *h* 2, draws up the piſton beyond C as far as W. The ſteam, then, expanded ſo as to fill up all the cylinder, would not quite ſupport it, if it was not for the over weight above-mentioned. If this was not true, when the end *h* 2 is down as low as it can go, and reſts upon the beams that bear its center, the chain L H above the piſton would grow ſlack, and the piſton might ſometimes be puſhed out of the cylinder, which never happens. Again, when firſt the ſteam is let into the cylinder, the injected water is puſhed out at the eduction pipe *d* T Y, and is all out of the cylinder by that time the piſton is got up to C. If then the ſteam was ſtronger than air, it would fly out at Y after the water, the valve Y not being loaded. If it were exactly equal to the ſtrength of the air, it would juſt drive all the water out at Y, but could not follow itſelf, the preſſure being equal on each ſide of the valve by ſuppoſition. If it be weaker than the air, it will not force all the water out of the pipe *d* T Y, but the ſurface will ſtand, ſuppoſe at T, where the column of water T Y added to the ſtrength of the ſteam, is equal to the preſſure of the air. When the ſteam is $\frac{1}{10}$ weaker than the air, the height T Y is equal $3\frac{1}{2}$ feet. Now ſince the whole perpendicular diſtance from *d* to Y is but four feet, and the ſteam is always ſufficient to expel the water; it is plain it can never be more than $\frac{1}{10}$ part weaker than the air, when weakeſt. 9. As there is air in all the water injected, and that air cannot be taken out, or condenſed with the ſteam by the jet of cold water coming in at *n*, the whole operation would be diſturbed, and only a very imperfect vacuum made, were it not for the following contrivance. We are to remember that when ſteam is become as ſtrong as air, it is above fixteen times rarer; ſo that air will precipitate in ſteam, as quickſilver would in water. Therefore all the air extricated from the injected water, lies at the bottom of the cylinder over the ſurface of ſo much of the injected water as is come down to *d n*. Now there is without the cylinder at 4, a little cup with a valve, and from under the valve, a pipe going laterally into the cylinder above its bottom to receive the air into the cup. When, therefore, the ſteam firſt ruſhes into the cylinder, and is a little ſtronger than the

outward air, it will force the precipitated air to open the valve at 4, and make its escape; but the steam cannot follow, because it is weaker than the external air, as the piston, by ascending, gives it room to expand. This valve from the noise it makes is called the snifting clack. 10. But amongst the greatest improvements of this engine, we may reckon that contrivance by which the engine itself is made to open and shut the regulator and injection-cock, and that more nicely than any person attending could possibly do it. For if the man who turns the regulator at E, and the injection-cock N, when the piston is coming down, opens the regulator and lets in the steam too soon to raise the piston again, the stroke will be shorter than it ought to be; and if he does not open the regulator soon enough, the piston coming down with a prodigious force, will very probably strike against the throat pipe D *d* at *d*, and crush it to pieces. Likewise when the regulator is open, the steam going into the cylinder, and the piston rising, the stroke will not have its full length, if the steam is turned off, and the cold water injected too soon; and if injected too late, the steam may throw the piston quite out of the cylinder's top at L. To prevent, therefore, all such accidents, there is fixed to an arch Z, at a proper distance from the arch P, a chain, from which hangs a perpendicular piece, or working beam Q Q, which comes down quite to the floor, and goes through it in a hole which it fits very exactly. This piece has a long slit in it, and several pin holes and pins for the movement of several levers destined to the office of opening and shutting the cocks after the following manner. 11. Between two perpendicular pieces of wood on each side of P, there is a square axis A B (*ibid.* n° 2.) which has upon it several iron pieces of the lever kind. The first is the piece C E D called the Y, from its representing that letter inverted by its two shanks, E and D; on the upper part is a weight F, to be raised higher and lower, and fixed as occasion requires. This Y is fixed very fast upon the said iron axle AB. 12. From the axle hangs a sort of an iron stirrup, I K L G, by its two hooks I G, and having on the lower part two holes K L, through which passes a long iron pin L K, and keyed in the same. When this pin is put in, it is also passed through the two holes in the ends E N of the horizontal fork or spanner E Q N, joined at its end Q to the handle of the regulator V 10. From Q to O are several holes, by which the said handle may be fixed to that part of the end which is most convenient. 13. Upon the axis A B is fixed at right angles to the Y an handle or lever G 4, which goes on the outside of the piece Q Q, and lies between the pins. Another handle is also fastened upon the same axle, *viz.* H 5, and placed at half a right angle to the former G 4: this passes through the slit of the piece Q Q, lying on one of its pins. Hence we see that when the working beam goes up, its pin in the slit lifts up the spanner H 5, which turns about the axle so fast, as to throw the Y with its weight F from C to 6, in which direction it would continue to move after it passed the perpendicular, were it not prevented by a strap of leather fixed to it at *x*, and made fast at the ends *m* and *n*, in such manner as to allow the Y to vibrate backwards and forwards about a quarter of a circle, at equal distance on this side and that of the perpendicular. 14. As things are represented in the figure, the regulator is open, its plate T Y being shewn on one side of the pipe S, which joins the cylinder and boiler. The piston is now up, and also the working beam near its greatest height, the pin in the slit has so far raised the spanner H 5, that the weight F on the head of the Y is brought so far from *n*, as to be past the perpendicular and ready to fall over towards *m*, which when it does, it will by its shank E, strike the iron pin K L with a smart blow, and drawing the fork O N horizontally towards the beam Q, will draw the end 10 of the regulator towards *t*, and thereby shut it, by slipping the plate Y under the holes of the throat-pipe S. 15. Immediately after the regulator is shut, the beam rising a little higher with its pin *S* on the outside upon the lower part, lifts up the end *i* of the handle of the injecting-cock, and opens it by the turning of the two parts with teeth. The jet immediately making a vacuum, the beam again descends, and the pin *r* depressing the handle *k i*, shuts the injection-cock; and the beam continuing to descend, the pin *p* bears down the handle G 4, and throwing back the Y, its


STEAM ENGINE.
No. 6.
No. 5.
From Water to fill the Boyler
To Steam
To Water
To Steam
To Water

its ſhank D throws forward the fork N Q, and again opens the regulator to receive freſh ſteam. After this every thing returns as before, and thus is the engine moſt wonderfully contrived to work itſelf.

16. Many years after the engine had been made, as above deſcribed, it received another improvement of very great advantage, and that was, inſtead of feeding the boiler with warm water, from the top of the cylinder (*ibid.* n° 1.) by the pipe W above, and F *f* below, they contrived to ſupply it with the ſcalding hot water which came out of the eduction-pipe *d* T Y, which now, inſtead of going into the waſte well at Y, was turned into the boiler on the top, and as the eduction-pipe before went out at the ſide of the cylinder, it was now inſerted in the bottom of it; and though the preſſure of the ſteam in the boiler be ſomewhat ſtronger than in the cylinder, yet the weight of water in the eduction-pipe being added to the force of ſteam in the cylinder will carry the water down continually, by overcoming the reſiſtance in the boiler.

This is the lever-engine with the improvements of Mr. Newcomen and others; but as captain Savary's, or rather the marquis of Worceſter's, is very cheap in reſpect of this machine, and as it is alſo applicable with great advantage when the heighth to which the water is to be raiſed does not exceed 100 or 150 feet, we ſhall here ſubjoin a view of that engine, with the improvements of Dr. Deſaguliers.

The boiler B B (plate XCII.) is a large copper body of a globular form, which will beſt of all withſtand the very great force of ſteam that in this caſe is neceſſary. Round the body of this boiler the fire and flame are conducted as ſhewn at T T T. It has a copper-cover ſcrewed on, which contains the ſteam-pipe C D, and two gage-pipes *n, o,* which by turning their cocks, ſhew the height of the water within as in the other engine. On the ſame cover P is a valve, over which lies a ſteel-yard, with its weight Q to keep it down, the ſtrength of the vapour being this way moſt exactly eſtimated. For being in the nature of a lever of the third ſort, it is plain, if the beam of the lever be divided into ten equal parts, and the firſt of them be upon the middle of the valve, and the weight Q hangs at the 2d, 3d, 4th, &c. diviſions, that then the force of the ſteam which can raiſe up the valve will be 2, 3, 4, &c. times as great as the weight. If the area of the valve be a ſquare inch, and Q = 15 lib. hanging at the ſecond diviſion is raiſed by a ſteam puſhing up the valve, it will ſhew that the ſteam will then preſs with the force of two atmoſpheres, and ſo on to ten atmoſpheres; but great care muſt be then taken that the ſteam ſo very ſtrong burſt not the boiler to pieces. The ſteam is carried from the boiler to a copper-veſſel A, by means of the pipe C D, and is let into it by turning the handle K of the ſteam-cock D I. The key of this cock is kept down by the ſcrew L, held up by the gibbet D L. The handle turned from K to *k* admits a paſſage to the ſteam into the copper-receiver A. This receiver A communicates at bottom with the ſucking pipe Z H going down to the water H in the well X, and above with the forcing pipe E E, which goes up a little above the water of the reſervoir R, and between theſe pipes are two valves F and G both opening upwards. The ſteam being let in upon the water of the receiver A, forces it up through the valve F, and the pipe E E to the reſervoir, and then the receiver is full of hot ſteam. This ſteam in the receiver is condenſed by a jet of cold water coming from the forcing pipe by the ſmall pipe M I, being let in and ſhut off by the cock at M. The ſteam being condenſed by this jet will be reduced within a very ſmall ſpace, and ſo make a vacuum, upon which the water in the well will ruſh up the forcing pipe to reſtore the equilibrium, and thus again fill the receiver A, the little air being compreſſed within a ſmall compaſs at the top above *b c*. That there may be always water in the force-pipe for the jet, there is a little pipe which brings the water to it from the reſervoir with the ſmall ſtop-cock Y, to ſhut it off upon occaſion. The valves at F and G are examined at any time by unſcrewing the pin 1 to looſen the ſtrap 2, and let down the flanch 3, all which parts are ſhewn larger in the figures n° 5. By the particular contrivance of the cock at D I, and its key, the water is made to paſs from the force-pipe to the boiler to ſupply the waſte in ſteam. This is plainly ſhewn in the ſections of the cock and key, where 5 is the top of the key, 6 is a hole on one ſide, which goes down to the bottom to

convey

convey the ſteam, or jet of water alternately to the receiver; 7 is a notch on the other ſide to take in the water from the force pipe, and conduct it to the boiler B. How this is done is eaſy to conceive from a view of the two ſections of the cock and key, in two poſitions within it. The boiler may hold about five or ſix hogſheads, and the receiver one hogſhead. It will work four or five hours without recruiting: about four ſtrokes a minute will produce upwards of 200 hogſheads per hour. This ſteam makes a vacuum ſo effectually, as to raiſe water from the well to the height of twenty-nine or thirty feet; and ſuppoſe the ſteam able to lift up the ſteelyard with its weight hanging at the 6th diviſion, it will then be able to raiſe a column of water above fifty yards high, as being then ſix times ſtronger than the preſſure of the atmoſphere, as is eaſily underſtood from what has been ſaid upon the fire-engine, the water being raiſed in a ſimilar manner in both machines, there by the preſſure of condenſed elaſtic air, and here by the preſſure of rarefied elaſtic ſteam. See the article ENGINE *for extinguiſhing fires*.

This engine conſiſts of ſo few parts, that it comes very cheap in proportion to the water that it raiſes, but it has its limits. On the other hand, the lever-engine, often called Newcomens, has its limits alſo; that is, it muſt not be too ſmall, for then it will have a great deal of friction in proportion to the water that it raiſes, and will coſt too dear; having as many parts as the largeſt machines, which are the beſt and cheapeſt in proportion to the water they raiſe.

In the Philoſophical Tranſactions there is an account of an improvement made in the ſteam-engine by Mr. Payne, as follows. He has contrived two iron-pots or veſſels of a conical form inverted as repreſented by A B E F (n° 6.) on the upper-head of which is fixed a globular copper-head, of about 5 ½ feet diameter, as L M N. Then there is placed on the inſide a ſmall machine H, called the diſpenſer, with ſpouts *a b c d e*, &c. round the ſides fixed to it, and the bottom thereof reſts on a center pin O. In this machine is fixed an upright tube G with holes at the bottom, and a funnel P on the top, to receive a ſpout of water from a conduit-pipe Q, by the ſtop-cock R. Two or more of theſe veſſels are placed in a reverberatory arch for conveying the intenſe heat of a ſtrong fire, the flame whereof encompaſſes the iron-veſſels, and keeps them in a red heat during the time of their uſe, at which time the cog-wheel I being turned by proper machinery, whirls the diſpenſer about with great velocity, and cauſes the water in it to fly through the ſpouts againſt the ſides of the red hot pots. By this means, the greateſt part of the water is converted into vapour or elaſtic ſteam, which is conveyed by a common pipe and cock to the barrel of the engine to put the piſton in motion, and the waſte water is conveyed away at bottom by means of a pipe C D, with a valve at D to keep out the air.

Before we conclude the ſubject of ſteam-engines, we ſhall add a moſt curious and uſeful table of the calculation of the power of the lever-engines, for the various diameters of the cylinder, or ſteam-barrel, and bore of the pump, that are capable of raiſing water from 48 to 440 hogſheads *per* hour, at any depth from 15 to 100 yards. It was compoſed by Henry Beighton, and is founded on this principle, that the ale-gallon of 282 cubic inches of water weighs 10 ℔. 3 ℥. averdupois, and a ſuperficial ſquare inch is preſſed with the weight of 14 ℔. 13 ℥. of air, when the mercury ſtands at a medium in the barometer. But allowing for ſeveral frictions, and to give a conſiderable velocity to the engine, it is found by experience that no more than 8 ℔. of preſſure muſt be allowed to an inch ſquare on the piſton in the cylinder, that it may make about ſixteen ſtrokes in a minute at about ſix feet to each ſtroke. This calculation is but the ordinary power in practice, for with large boilers the piſton will make twenty or twenty-five *per* minute, and each of them ſeven or eight feet; and then a pump of nine inches bore will diſcharge more than 320 hogſheads *per* hour, and for other ſizes proportionably.

Table

Table ſhewing the Diameter of the Cylinder and Bore of the Pump that is capable of raiſing any Quantity of Water, from 48 to 440 Hogſheads an Hour, at any Depth from 15 to 100 Yards.

Diameter of the bore.	will hold in a yard.	will draw by ſix feet ſtroke.	weight in one yard.	at 16 ſtrokes a minute.	63 gal. to a hogſhead.		in one hour.		Diameter of the cylinder in inches. The depths in yards.												
inch.	gallons	gallons	pounds avoird.	gallons	hhd.	gall.	hhd.	gall.	15	20	25	30	35	40	45	50	60	70	80	90	100
12	14.4	28.8	146.	462.	7	21	440		18½	21¾	24	26½	28½	30½	32½	34¼	37¼	40			
11	12.13	24.	123.5	338.	6	20	369	3	17	19¾	22	24¾	26¼	28	29¾	31¼	34¼	37	39½		
10	10.02	20.04	102.	320.	5	5	304	48	15½	18	20	22	23¾	25¼	27	28¾	31¼	33¾	36	38½	40
9	8.12	16.2	82.7	259.8	4	7	247	7	14	16¼	18	20	21½	23	24½	25	28	30½	33	35	36½
8½	7.26	14.5	73.9	232.3	3	43	221	15	13½	15¼	17¼	19	20¼	21¾	23	24	26¼	28½	31	32½	35¼
8	6.41	12.8	65.3	205.2	3	16	195	22	12½	14½	16½	18½	19	20½	21½	23	25	27	29	30½	32½
7¾	6.01	12.2	61.2	192.3	3	2	182	13	12	14	15½	17½	18¾	19¾	21	22	24¼	26	28	29½	31½
7½	5.66	11.3	57.6	181.1	2	55	172	30	11	13¾	15	16½	18	19	20	21¼	23¼	25	27	28½	30¼
7	4.91	9.8	50.0	157.1	2	31	149	40	10¾	13	14	15½	16¾	18¾	19	20½	22	24	25½	27	28½
6½	4.23	8.4	43.0	135.3	2	9	128	54	10	12	13	14	15½	16¼	18	19	20	22	23	24½	26¼
6	3.61	7.2	36.7	115.5	1	52	110	1	9½	11	12	13	14	15½	16	17	19	20½	22	23	24½
5½	3.13	6.2	31.8	99.2	1	36	94	30		10	11	12	13	14	15	15¾	17	19	20	21	22¼
5	2.51	5.0	25.5	80.3	1	7	66	61			10	11	11¾	13	13¾	14	15½	16¾	18½	19¼	20¼
4½	2.02	2.4	20.5	64.6	1	1	60	60				10	11	11¾	12	13½	14	15	16	17	18¼
4	1.6	3.2	16.2	51.2	0	51	48	51					9	10	11	11½	12	13½	14	15	16

An example of the uſe of the table. Suppoſe it were required to draw 150 hogſheads *per* hour, at 90 yards deep: in the ſeventh column I find the neareſt number 149 hogſheads; and againſt it, in the firſt column, I find a ſeven inch bore; then, under 90, the depth, on the right in the ſame line, I have 27 inches, the diameter of the cylinder fit for that purpoſe: and ſo for any other.

Tanning-ENGINE. See the article TANNING-ENGINE.

Water-ENGINES, thoſe made for raiſing water: ſuch is the ſteam-engine, already deſcribed. See alſo WATER-WORKS.

ENGINEER, or INGINEER, properly denotes a contriver, or maker, of engines. See the preceding article.

ENGINEER, in the military art, an able, expert man, who, by a perfect knowledge in mathematics, delineates upon paper, or marks upon the ground, all ſorts of forts, and other works proper for offence and defence. He ſhould underſtand the art of fortification, ſo as to be able, not only to diſcover the defects of a place, but to find a remedy proper for them, as alſo how to make an attack upon, as well as to defend, the place. Engineers are extremely neceſſary

ceſſary for theſe purpoſes: wherefore it is requiſite that, beſides being ingenious, they ſhould be brave in proportion. When at a ſiege the engineers have narrowly ſurveyed the place, they are to make their report to the general, by acquainting him which part they judge the weakeſt, and where approaches may be made with moſt ſucceſs. Their buſineſs is alſo to delineate the lines of circumvallation and contravallation, taking all the advantages of the ground; to mark out the trenches, places of arms, batteries, and lodgments, taking care that none of their works be flanked or diſcovered from the place. After making a faithful report to the general of what is a doing, the engineers are to demand a ſufficient number of workmen and utenſils, and whatever elſe is neceſſary.

ENGLAND, the ſouthern diviſion of Great Britain, ſituated in the Atlantic ocean, between 2° eaſt and 6° weſt longitude, and between 49° 55′ and 55° 55′ north latitude.

There are in England, including Wales, fifty-two counties, two archbiſhoprics, twenty-four biſhoprics, two univerſities, twenty-nine cities, upwards of eight hundred towns, and near ten thouſand pariſhes; ſuppoſed to contain about 6,000,000 of people.

As to the polity, trade, law, civil and religious antiquities, *&c.* of England, their ſeveral branches are treated of under the articles PARLIAMENT, PRIVY-COUNCIL, COURT, CUSTOM-HOUSE, ADMIRALTY, *&c.*

New-ENGLAND, comprehending the colonies of Maſſachuſets, New Hampſhire, Connecticut, Rhode-iſland, and Providence Plantation, is ſituated between 67° and 73° weſt longitude, and between 41° and 45° north latitude.

The provinces into which New-England is divided, have different conſtitutions, and generally different governors, who have a negative voice in the choice of the members who are to ſerve as their council; and beſides, all laws muſt be ſent to Old England to receive the approbation of the crown, and no act of government is valid without the governor's conſent in writing.

ENGLECERIE, ENGLESHIRE, or ENGLISHERY, an antient word ſignifying the being an engliſhman, which was uſed in the time of king Canutus, to diſtinguiſh the Engliſh from the Danes, eſpecially in the caſe of murder, and its puniſhment; as where a perſon was privately killed, ſuch a perſon was deemed francigena, which comprehended every alien, till englecerie was proved; that is to ſay, till he was made out to be an engliſhman, in which caſe the town, *&c.* wherein it was committed, was exempted from amercement, which it was liable to if the murderer of a dane eſcaped out of it unpuniſhed. The manner of proving the party ſlain to be an engliſhman, was before the coroner, by two men that knew his father, and two women that knew his mother. This was taken away by ſtatute 14 Edw. III. c. 4.

ENGLISH, or the ENGLISH-TONGUE, the language ſpoken by the people of England, and, with ſome variation, by thoſe of Scotland, as well as part of Ireland, and the reſt of the britiſh dominions.

The antient language of Britain is generally allowed to have been the ſame with the gaulic, or french; this iſland, in all probability, having been firſt peopled from Gallia, as both Cæſar and Tacitus affirm, and prove by many ſtrong and concluſive arguments, as their religion, manners, cuſtoms, and the nearneſs of their ſituation. But now we have very ſmall remains of the antient britiſh tongue, except in Wales, Cornwall, the iſlands and highlands of Scotland, part of Ireland, and ſome provinces of France; which will not appear ſtrange, when what follows is conſidered.

Julius Cæſar, ſometime before the birth of our Saviour, made a deſcent upon Britain, though he may be ſaid rather to have diſcovered than conquered it; but, about the year of Chriſt forty-five, in the time of Claudius, Aulus Plautius was ſent over with ſome roman forces, by whom two kings of the Britons, Codigunus and Caractacus, were both overcome in battle: whereupon a roman colony was planted at Malden in Eſſex, and the ſouthern parts of the iſland were reduced to the form of a roman province: after that, the iſland was conquered as far north as the Friths of Dumbarton and Edinburgh, by Agricola, in the time of Domitian; whereupon, a great number of the Britons, in the conquered part of the iſland, retired to the weſt part called Wales, carrying their language with them.

The greateſt part of Britain being thus become a roman province, the roman legions,

legions, who resided in Britain for above two hundred years, undoubtedly disseminated the latin tongue; and the people being afterwards governed by laws written in Latin, must necessarily make a mixture of languages. This seems to have been the first mutation the language of Britain suffered.

Thus the british tongue continued, for some time, mixed with the provincial latin, till, the roman legions being called home, the Scots and Picts took the opportunity to attack and harrass South Britain: upon which, K. Vortigen, about the year 440, called the Saxons to his assistance, who came over with several of their neighbours, and having repulsed the Scots and Picts, were rewarded for their services with the isle of Thanet, and the whole county of Kent: but growing too powerful, and not being contented with their allotment, dispossessed the inhabitants of all the country on the east side of the Severn: thus the british tongue was in a great measure destroyed, and the Saxon introduced in its stead.

What the saxon tongue was long before the conquest, about the year 700, we may observe in the most antient manuscript of that language, which is a gloss on the Evangelists, by bishop Eadfride, in which the three first articles of the Lord's prayer run thus.

"Uren fader thic arth in heofnas, sic "gehalgud thin noma, so cymeth thin "ric. Sic thin willa sue is heofnas, and "in eortho, *&c.*"

In the beginning of the ninth century, the Danes invaded England, and getting a footing in the northern and eastern parts of the country, their power gradually increased, and they became sole masters of it in about two hundred years. By this means the antient english obtained a tincture of the danish language: but their government, being of no long continuance, did not make so great an alteration in the Anglo-saxon, as the next revolution, when the whole land, *A. D.* 1067, was subdued by William the Conqueror, duke of Normandy in France: for the Normans, as a monument of their conquest, endeavoured to make their language as generally received as their commands, and thereby rendered the english language an entire medley.

About the year 900, the Lord's prayer in the antient Anglo-saxon, ran thus:

"Thu ure fader the eart on heofenum, "si thin nama gehalgod; cume thin "rice si thin willa on eorthan swa, swa "on heofenum, *&c.*"

About the year 1160, under Hen. II. it was rendered thus by pope Adrian, an englishman, in rhyme:

"Ure fader in heaven rich,
"Thy name be hayled ever lich,
"Thou bring us thy michell blisse:
"Als hit in heaven y-doe
"Evar in yearth beene it also, *&c.*"

Dr. Hickes gives us an extraordinary specimen of the english, as spoken in the year 1385, upon the very subject of the english tongue.

"As it is knowe how meny maner "peple beeth in this lond; there beeth "also so many dyvers longages and "tonges. Nothelefs Walschemen and "Scots that beeth nought medled with "other nations, holdeth wel nyh hir "firste longage and speche; but yif the "Scottes that were sometime confederat "and woned with the Pictes drawe "somewhat after hir speche; but the "Flemynges that woneth on the weste "side of Wales, haveth lost her strange "spech and speketh sexonliche now. "Also englishemen, they had from "the bygynnynge thre maner speche: "northerne, southerne, and middel "speche in the middel of the lond, as "they come of three maner of peple of "Germania: notheles by commyxtion "and mellynge first with Danes, and "afterwards with Normans in meny "the contrary longage is apayred. "(corrupted.)

"This apayrynge of the burthe of the "tunge is bycause of tweie thynges; "oon is for children in scole agenst "the usuage and maner of all other "nations, beeth compelled for to leve "hire own longage, and for to construe hir lessons and here thynges in "French, and so they haveth sethe Normans come first into Engelond. Also, "gentlemen children beeth taught to "speke Frensche from the tyme that "they beeth rokked in here cradel, and "kunneth speke and play with a childes "broche; and uplondissche men will "lykne hymself to gentilmen, and "fondeth with great besynesse for to "speake Frensche to be told of.---Hit "seemeth a greet wonder how englische-"men and her own longage and tonge "is so dyverse of sown in this oon "ilond: and the longage of Nor- "mandie

" mandie is comlynge of another lond, " and hath oon manner soun amonge " alle men that speketh hit arigt in " Engelond. Also of the foresaid " saxon tonge that is deled (divided) a " three, and is abide scarceliche with " fewe uplondissche men is greet wonder. " For men of the est, with men of the " west, is, as it were, undir the same " partie of hevene acordeth more in " sownynge of speche, than men of the " north, with men of the south. There- " fore it is that mercii, that beeth men " of myddel Engelond, as it were, par- " teners of the endes, understondeth " bettre the side longages northerne, and " southerne, than northerne or southerne " understondeth either other.—All the " longage of the Northumbers and " spechialliche at York, is so scharp, " slitting and frotynge, and unschape, " that we southerne men may that " longage unnethe understonde, *&c.*"

Hickes's *Thesaur. liter. sept.*

In the year 1537, the Lord's prayer was printed as follows: " O oure father " which arte in heven, halowed be thy " name: let thy kingdome come, thy " will be fulfiled as well in erth as it " is in heven; geve us this daye in " dayly bred, *&c.*" Where it may be observed that the diction is brought almost to the present standard, the chief variations being only in the orthography. By these instances, and many others that might be given, it appears, that the english saxon language, of which the Normans despoiled us in a great measure, had its beauties, was significant and emphatical, and preferable to what they imposed on us. " Great, verily," says Camden, " was the glory of our tongue, " before the norman conquest, in this, " that the old english could express, " most aptly, all the conceptions of the " mind in their own tongue, without " borrowing from any." Of this he gives several examples.

Having thus shewn how the antient british language was, in a manner, extirpated by the Romans, Danes, and Saxons, and succeeded by the Saxon, and after that the Saxon blended with the Norman French, we shall now mention two other causes of change in the language: the first of these is owing to the Britons having been a long time a trading nation, whereby offices, dignities, names of wares, and terms of traffic are introduced, which we take with the wares from the persons of whom we have them, and form them anew, according to the genius of our own tongue; and besides this change in the language, arising from commerce, Britain's having been a considerable time subject to the see of Rome, in ecclesiastical affairs, must unavoidably introduce some italian words among us. Secondly, as to the particular properties of a language, our tongue has undergone no small mutation, or rather has received no small improvement upon that account: for, as to the Greek and Latin, the learned have, together with the arts and sciences, now rendered familiar among us, introduced abundance; nay almost all the terms of art in the mathematics, philosophy, physic, and anatomy; and we have entertained many more from the Latin, French, *&c.* for the sake of neatness and elegancy: so that, at this day, our language, which about 1800 years ago, was the antient British, or Welsh, *&c.* is now a mixture of Saxon, Teutonic, Dutch, Danish, Norman, and modern French, embellished with the Greek and Latin. Yet this, in our opinion, is so far from being a disadvantage to the english tongue, as now spoke (for all languages have undergone changes, and do continually participate with each other) that it has so enriched it, as now to become the most copious, significant, fluent, courteous, amorous and masculine language in Europe, if not in the world: This, indeed, was Camden's opinion of it in his time, and Dr. Heylin's in his time: if then the english tongue, in the opinion of these learned authors, deserved such a character in their days, how much more now, having since received so considerable improvements from so many celebrated writers.

ENGONASIS, a name given to the constellation Hercules. See HERCULES.

ENGRAFTING, or GRAFTING, in gardening. See the article GRAFTING.

ENGRAILED, or INGRAILED, in heraldry, a term derived from the french *gresly*, hail; and signifying a thing the hail has fallen upon and broke off the edges, leaving them ragged, or with half rounds, or semicircles, struck out of their edges.

ENGRAVING, the art of cutting metals and precious stones, and representing thereon figures, letters, or whatever device, or design, the artist fancies.

Engraving, properly a branch of sculpture,

ture, is divided into ſeveral other branches, according to the matter whereon it is employed, and the manner of performing it.

The original way of engraving on wood is denominated, at preſent, with us, by cutting in wood; that on metals with aquafortis, is named etching; that by the knife, burniſher, punch, and ſcraper, is called mezzotinto; that on ſtones for tombs, &c. ſtone-cutting; and that performed with the graver, on metals or precious ſtones, keeps alone the primitive name of engraving, being that which we ſhall at preſent attend to. See the articles CUTTING, ETCHING, MEZZOTINTO, and SCULPTURE.

ENGRAVING *on copper* is employed in repreſenting portraits, hiſtories, landſkips, foliages, figures, buildings, &c. either after paintings, or deſigns, for that purpoſe. See DESIGN and PAINTING.

It is performed with the graver on a plate of copper, which, being well poliſhed, is covered over thinly with virgin-wax, and then ſmoothed, while warm, with a feather, ſo that the wax be of an equal thickneſs on the plate; and on this the draught or deſign, done in black lead, red chalk, or ungummed ink, is laid with the face of the drawing on the wax: then they rub the backſide, which will cauſe the whole deſign of the drawing to appear on the wax. The deſign, thus transferred, is traced through on the copper, with a point, or needle; then heating the plate, and taking off the wax, the ſtrokes remain to be followed, heightened, &c. according to the tenor of the deſign, with the graver, which muſt be very ſharp, and well pointed. See the article GRAVER.

In the conduct of the graver conſiſts almoſt all the art, which depends not ſo much upon rules as upon practice, the habitude, diſpoſition, and genius of the artiſt, the principles of engraving being the ſame with thoſe of painting; for if an engraver be not a perfect maſter of deſign, he can never hope to arrive at a degree of perfection in this art. In conducting the ſtrokes, or cuts, of the graver, he muſt obſerve the action of the fingers, and of all their parts, with their outlines; and remark how they advance towards, or fall back from his ſight, and then, conduct his graver, according to the riſings or cavities of the muſcles, or folds, widening the ſtrokes in the light, and contracting them in the ſhades; as alſo at the extremity of the outlines, to which he ought to conduct the cuts of the graver, that the figures or objects repreſented, may not appear as if they were gnawn; and lightening his hand, that the outlines may be perfectly ſound, without appearing cut or ſlit; and although his ſtrokes neceſſarily break off where a muſcle begins, yet they ought always to have a certain connection with each other, ſo that the firſt ſtroke ſhould often ſerve to make the ſecond, becauſe this will ſhew the freedom of the graver.

If hair be the ſubject, let the engraver begin his work by making the outlines of the principal locks, and ſketch them out in a careleſs manner, which may be finiſhed, at leiſure, with finer and thinner ſtrokes to the very extremities.

The engraver muſt avoid making very acute angles, eſpecially in repreſenting fleſh, when he croſſes the firſt ſtrokes with the ſecond, becauſe it will form a very diſagreeable piece of tabby-like lattice-work, except in the repreſentation of ſome clouds, in tempeſts, the waves of the ſea, and in repreſentations of ſkins of hairy animals, and leaves of trees. So that the medium between ſquare and acute ſeems to be the beſt and moſt agreeable to the eye. He that would repreſent ſculpture, muſt remember that, as ſtatues, &c. are moſt commonly made of white marble, or ſtone, whoſe colour does not produce ſuch dark ſhades as other matters do, have no black to their eyes, nor hair of the head, and beard flying in the air. If the engraver would preſerve one quality and harmony in his works, he ſhould always ſketch out the principal objects of his piece before any part of them are finiſhed.

The inſtruments neceſſary for this ſort of engraving are, beſides a graver, a cuſhion, or ſand bag, made of leather, to lay the plate on, in order to give it the neceſſary turns and motions; a burniſher made of iron, or ſteel, round at one end, and uſually flattiſh at the other, to rub out ſlips and failures, ſoften the ſtrokes, &c. a ſcraper, to pare off the ſurface, on occaſion; and a rubber of a black hat, or cloth rolled up, to fill up the ſtrokes that they may appear the more viſible.

In engraving on precious ſtones, they uſe either the diamond or the emery. The diamond, which is the hardeſt of all

 ſtones,

ſtones, is only cut by itſelf, or with its own matter. The firſt thing to be done in this branch of engraving, is to cement two rough diamonds to the ends of two ſticks big enough to hold them ſteady in the hand, and to rub or grind them, againſt each other, till they be brought to the form deſired. The duſt, or powder that is rubbed off ſerves afterwards to poliſh them, which is performed with a kind of mill that turns a wheel of ſoft iron. The diamond is fixed in a braſs diſh, and, thus applied to the wheel, is covered with diamond-duſt, mixt up with oil of olives; and when the diamond is to be cut facet-wiſe, they apply firſt one face, then another, to the wheel. Rubies, ſapphires, and topazes, are cut and formed the ſame way on a copper wheel, and poliſhed with tripoli diluted in water. As to agates, amethyſts, emeralds, hyacinths, granates, rubies and others of the ſofter ſtones, they are cut on a leaden wheel, moiſtened with emery and water, and poliſhed with tripoli on a pewter wheel. Lapis-lazuli, opal, &c. are poliſhed on a wooden wheel. To faſhion and engrave vaſes of agate, cryſtal, lapis-lazuli, or the like, they make uſe of a kind of lathe, like that uſed by pewterers to hold the veſſels, which are to be wrought with proper tools; that of the engraver generally holds the tools, which are turned by a wheel; and the veſſel is held to them to be cut and engraved, either in relievo or otherwiſe; the tools being moiſtened, from time to time, with diamond-duſt and oil; or, at leaſt, emery and water. To engrave figures or devices on any of theſe ſtones, when poliſhed, ſuch as medals, ſeals, &c. they uſe a little iron wheel, the ends of whoſe axis are received within two pieces of iron, placed upright, as in the turner's lathe; and to be brought cloſer, or ſet further apart, at pleaſure: at one end of the axis are fitted the proper tools, being kept tight by a ſcrew. Laſtly, the wheel is turned by the foot, and the ſtone applied by the hand to the tool, and is ſhifted and conducted as occaſion requires.

The tools are generally of iron, and ſometimes of braſs: their form is various, but it generally bears ſome reſemblance to chiſſels, gouges, &c. Some have ſmall round heads, like buttons, others like ferrels, to take the pieces out, and others flat, &c. when the ſtone has been engraven, it is poliſhed on wheels of hair-bruſhes and tripoli.

ENGRAVING *on ſteel* is chiefly employed in cutting ſeals, punches, matrices, and dyes proper for ſtriking coins, medals, and counters. The method of engraving with the inſtruments, &c. is the ſame for coins as for medals and counters: All the difference conſiſts in their greater or leſs relievo, the relievo of coins being much leſs conſiderable than that of medals, and that of counters ſtill leſs than that of coins.

Engravers in ſteel commonly begin with punches, which are in relievo, and ſerve for making the creux, or cavities, of the matrices, and dyes: though ſometimes they begin with the creux, or hollowneſs, but then it is only when the intended work is to be cut very ſhallow. The firſt thing done, is that of deſigning the figures; the next is the moulding them in wax, of the ſize and depth they are to lie, and from this wax the punch is engraven. When the punch is finiſhed they give it a very high temper, that it may the better bear the blows of the hammer with which it is ſtruck to give the impreſſion to the matrix. See the articles PUNCH and MATRIX.

The ſteel is made hot to ſoften it, that it may the more readily take the impreſſion of the punch; and after ſtriking the punch on it, in this ſtate, they proceed to touch up or finiſh the ſtrokes and lines, where, by reaſon of their fineneſs, or the too great relievo, they are any thing defective, with ſteel gravers of different kinds, chiſſels, flatters, &c. being the principal inſtruments uſed in graving on ſteel.

The figure being thus finiſhed, they proceed to engrave the reſt of the medal, as the mouldings of the border, the engrailed ring, letters, &c. with little ſteel punches, well tempered, and very ſharp.

ENGROSSING, or INGROSSING. See the articles INGROSSER and INGROSSING.

ENGUICHE', in heraldry, is ſaid of the great mouth of a hunting horn, when its rim is of a different colour from that of the horn itſelf.

ENHARMONIC, in the antient muſic, one of their genera or kinds of muſic, ſo called from its ſuperior excellence; tho' wherein it conſiſted, ſays Mr. Malcom, is hard to ſay: it was allowed by all to be ſo very difficult, that few could ever practiſe it.

Others ſay it is a ſpecies of muſic, the

modulation whereof proceeds by intervals leſs than ſemitones; as the ſemitone minor, enharmonic dieſis, and third major. See SEMITONE, DIESIS, and THIRD.

This genus, ſays Broſſard, was greatly uſed in the greek muſic, eſpecially in dramatic performances. But as thoſe almoſt inſenſible elevations and fallings of the voice, whereof it conſiſts, are too difficult, and as they ſometimes make the concord falſe, it has been laid aſide, and even loſt, though ſeveral great authors have made many attempts to recover it. See the articles GENUS, INTERVAL, and SYSTEM.

ENHERITANCE, or INHERITANCE. See the article INHERITANCE.

ENHYDRUS, in natural hiſtory, a genus of ſiderochita or cruſtated ferrugineous bodies, formed in large and in great part empty caſes, incloſing a ſmall quantity of an aqueous fluid.

Of this genus there are only two ſpecies. 1. The thick-ſhelled enhydrus, with black, reddiſh-brown, and yellow cruſts. 2. The thinner-ſhelled kind, with yellowiſh-brown, and purple cruſts; neither of which ferments with aqua fortis, or gives fire with ſteel.

ENIGMA, or ÆNIGMA. See the article ÆNIGMA.

ENIXUM, among chemiſts, a kind of neutral ſalt, generated of an acid and an alkali.

The ſal enixum of Paracelſus, is the caput mortuum of ſpirits of nitre with oil of vitriol, or what remains in the retort after the diſtillation of this ſpirit; being of a white colour, and pleaſing acid taſte. If this be diſſolved in hot water, and cryſtallized, it will be a yet more pleaſant medicine, agreeing in virtues with vitriolated tartar. It is diuretic, and may be given from a ſcruple to a dram, in broth or water-gruel.

ENLARGE, in the manege, is to make a horſe go large, or embrace more ground than he before covered.

To this purpoſe you ſhould prick with both heels, or aid him with the calves of the legs, and bear your hand outwards; or rather prick him with the inner heel, ſuſtaining him with the outer leg, in order to preſs him forwards, and make his ſhoulders go.

ENMANCHE', in heraldry, is when lines are drawn from the center of the upper edge of the chief to the ſides, to about half the breadth of the chief; ſignifying ſleeved, or reſembling a ſleeve, from the french *manche*.

ENNEADECAETERIS, in chronology, the name by which the Greeks called the lunar cycle of nineteen years. See the article CYCLE.

ENNEAGON, in geometry, a polygon with nine ſides. See the article POLYGON.

ENNEAHEDRIA, in natural hiſtory, a genus of columnar, cryſtalliform, and double-pointed ſpars, compoſed of a trigonal column, terminated at each end by a trigonal pyramid.

Of this genus there are ſeveral ſpecies, diſtinguiſhed by the length or ſhortneſs of the column and pyramids, none of which will give fire with ſteel, but all of them ferment with aqua-fortis. See the article SPAR.

ENNEANDRIA, in botany, a claſs of plants with hermaphrodite flowers, and nine ſtamina or male parts in each. See the article BOTANY.

To this claſs belong the laurus, rheum, ſpondias, and butomus. See the articles LAURUS, *&c.*

ENS, among metaphyſicians, denotes entity, being, or exiſtence: this the ſchools call *ens reale*, and *ens poſitivum*, to diſtinguiſh it from their *ens rationis*, which is only an imaginary thing, or exiſts only in the imagination.

ENS, among chemiſts, imports the power, virtue, and efficacy which certain ſubſtances exert upon our bodies. Paracelſus ſpeaks much of the *ens primum* of minerals, gems, herbs, and liquors: by which he means, the parts in which their virtues reſide, or the very virtue or efficacy itſelf. Authors relate wonders of the renovating power of the *ens primum* of baum, and other plants, which is different in each kind.

ENS VENERIS, the ſublimate of equal quantities of dulcified calx of vitriol, and the dried flowers of ſal ammoniac, a ſmall proportion of which turns a large one of the infuſion of galls black: it is red, ſaline, and aſtringent; and ſaid to be an excellent medicine in diſtempers ariſing from a weakneſs of the ſolids, as the rickets, and the like.

ENS, in geography, a city of Germany, ſituated at the confluence of the Danube and the river Ens, about eighty miles ſouth of Vienna: eaſt long. 14° 20′, north lat. 48° 16′.

ENSIFORM, in general, ſomething reſembling a ſword, *enſis*: thus we find mention

tion of ensiform leaves, ensiform cartilage, &c. See LEAF and XIPHOIDES.

ENSIGN, in the military art, a banner under which the soldiers are ranged according to the different companies or parties they belong to. See the articles COLOURS, FLAG, STANDARD, &c.

The european ensigns are pieces of taffety with various figures, arms, and devices painted on them, in different colours: the turkish ensigns are horses-tails.

ENSIGN is also the officer that carries the colours, being the lowest commissioned officer in a company of foot, subordinate to the captain and lieutenant. It is a very honourable and proper post for a young gentleman at his first coming into the army: he is to carry the colours both in assault, day of battle, &c. and should not quit them but with his life: he is always to carry them himself on his left shoulder: only on a march he may have them carried by a soldier. If the ensign is killed, then the captain is to carry the colours in his stead.

ENSISHEIM, a town of Germany, in the langraviate of Alsace, about fifty miles south of Strasburg: east long. 7° 30′, north lat. 47° 50′.

ENSKIRKEN, a town of Germany, fifteen miles south-west of Cologn.

ENTABLATURE, or ENTABLEMENT, in architecture, is that part of an order of a column, which is over the capital, and comprehends the architrave, frieze, and corniche.

The entablature is also called the trabeation, and seems borrowed from the latin, *trabs*, a beam; though others derive it from *tabulatum*, a ceiling, because the frieze is supposed to be formed by the ends of the joists which bear upon the architrave.

It is different in different orders; for notwithstanding that it consists of the three above-mentioned divisions in all, yet these parts are made up of more or fewer particular members or subdivisions, according as the order is more or less rich. Vignola makes the entablature a quarter of the height of the whole column in all the orders. In the tuscan and doric, the architrave, frieze, and corniche, are all of the same height. In the ionic, corinthian, and composite, the whole entablature, being of fifteen parts, five of these go to the architrave, four to the friezes, and six to the corniche. See the articles TUSCAN, DORIC, &c.

Mr. le Clerc observes, that were we to regard only the laws of strength and weakness, we should rather diminish the entablatures of such columns as have pedestals, than those which have none. As to the projecture of the entablature, it should never be forgot, that its principal design is to shelter what is underneath.

ENTABLATURE, in masonry, is used sometimes to denote the last row of stones on the top of the wall of a building, on which the timber and covering rest. This is often made to project beyond the naked of the wall, to carry off the rain.

ENTABLER, in the manege, the fault of a horse whose croupe goes before his shoulders in working upon volts; which may be prevented by taking hold of the right rein, keeping your right leg near, and removing your left leg as far from the horse's shoulder as possible.

This is always accompanied with another fault called aculer. See ACULER.

ENTAIL, in law, is a fee estate entailed; that is, abridged and limited to certain conditions prescribed by the donor or grantor. See the articles FEE, RECOVERY, and TAIL.

ENTE', in heraldry, a method of marshalling more frequent abroad than with us, and signifying grafted or ingrafted.

We have, indeed, one instance of enté in the fourth grand quarter of his majesty's royal ensign, whose blazon is Brunswick and Lunenburg impaled with antient Saxony, *ente en pointe*, grafted in point.

ENTELECHIA, ἐντελέχεια, a word used by Aristotle to express the soul, and which, not occurring in any other author, has given the commentators upon that philosopher great trouble to discover its true meaning. See the article SOUL.

Hemolaus Barbarus is even said to have consulted the devil about it, after which, in his paraphrase on Themistius, either from the devil or himself, renders it *perfectihabia*, which is nothing clearer.

Cicero, whose interpretation of this word should be esteemed preferable to that of any modern writer, defines entelechia *quædam quasi continuata & perennis motio*, a certain continued and perpetual motion: whence it would appear, that Aristotle took the soul for a mode of the body, a continuous and perpetual motion being undoubtedly a mode of body. The vulgar peripatetics hold entelechia to signify act, and under it suppose the form of the compound or animal to be understood. The latest peripatetics

tetics agree, that the act, or entelechia, whereby Aristotle meant to explain the nature of the soul, is either some mode of the body, or it is nothing at all.

ENTERING *of a hawk*, among sportsmen, the letting her kill for the first time.

ENTERING *of hounds*, is the instructing them how to hunt. See ENTRANCE.

ENTEROCELE, εντεροκηλη, in surgery, a tumour formed by a prolapsion of the intestines through the rings of the abdomen, and processes of the peritonæum, into the scrotum. It is sometimes termed an oscheocele and complete hernia, in contradistinction to the bubonocele. See the article BUBONOCELE, *&c.*

This disorder arises from a violent distention of the peritonæum and rings of the abdominal muscles, through which the intestine prolapses into the scrotum; and proceeds from some violence by a fall, blow, or straining to leap, lift up great weights, vomiting, *&c.* and according to the nature of the cause, the rupture is formed, either instantly or imperceptibly by degrees. This rupture is always attended with pains, and usually happens but in one side, never in both at a time: sometimes the intestine alone falls down; at other times, it is accompanied with the omentum. The tumour appears soft to the touch like an intestine, or bladder, distended with wind: it first appears small in the inguen, and gradually descends down to the testicle of the same side in the scrotum, which is thereby sometimes distended half way down the thigh, and even down to the knee: the other symptoms are the same with those of the bubonocele.

The tumour is encreased by crying, plentifully eating, lifting, or carrying any burden; it is contracted with cold, and dilated with heat: it may be distinguished generally from the hydrocele or pneumatocele, by its returning into the abdomen with a murmuring noise.

This kind of rupture may be sustained with but little inconveniences by men not much addicted to hard labour, and women with child; but it should never be left to itself without a support or truss, lest, by some accident, the intestines should become incarcerated, and incapable of being returned. When the disorder is recent, and in a young subject, it may be perfectly cured without danger of a relapse; as it may also in adults and old people, by constantly wearing a proper truss. It is less dangerous when the intestine is attended with the omentum. When the intestine is returnable, the surgeon should immediately reduce the parts, and retain them in their proper situation, and to close up the aperture firmly with a truss, bandage, or by incision, termed celotomy.

Another method consists chiefly in passing a small gold-wire round the upper part of the process of the peritonæum, near the ring of the abdominal muscles, leaving the testicle in its natural position: the wire is twisted by a pair of forceps, so as to confine the process of the peritonæum without compressing the spermatic vessels, in order to prevent the intestine from falling through it again: this method, however, is not thought effectual in most cases by Heister.

In order to preserve the testicle, some surgeons do not tie the process of the peritonæum and spermatic vessels with a ligature, but having returned the intestines and omentum, they then scarify the ring of the abdomen, through which the intestine prolapsed, together with the skin, in order to render the cicatrix more firm.

If in the enterocele the intestine cannot be reduced, especially if it adhere to the process of the peritonæum, ring of the abdominal muscles, scrotum, or testicle, no truss or bandage will be of any service: there is, then, but one method of saving the patient, by a severe operation; in order to which the integuments are to be divided; and when the sacculus appears, it is to be separated, and a small aperture made in it big enough to introduce a quill, or some other instrument to separate the intestine from all its adhesions, before it is protruded into the abdomen, which should always be done when the intestine adheres; after which the wound is to be healed, and the patient secured from a relapse, by wearing the bandage-spica. See BANDAGE and TRUSS.

If the stricture of the intestine is so great as to render all means ineffectual to reduce the rupture, the surgeon must then have recourse to the knife to save the patient.

ENTERO-EPIPLOCELE, a species of rupture, wherein the omentum, together with the intestines, fall into the scrotum. See the preceding article.

ENTEROLOGY, a term used by physicians, for a discourse or treatise on the contents of the head, breast, and abdomen. See the articles HEAD, *&c.*

ENTEROMPHALUS, the ſame with a hernia umbilicalis, or rupture at the navel. See the article EXOMPHALUS.

ENTERPLEADER, in law, ſignifies the diſcuſſing or trial of a point, incidentally falling out, before the principal cauſe can be determined.

It is allowed that a defendant cannot be twice charged with the ſame thing, or to two ſeverally, where no default is in him; thus if one man brings detinue againſt the defendant upon bailment of goods, and another a trover againſt the ſame perſon; in this caſe there ſhall be an enterpleader, to aſcertain which of the parties has a right to his action.

Judgment may be given on an enterpleader, to recover what is demanded againſt the defendant; and where two have enterpleaded, the perſon recovering ſhall have damages of the other.

ENTERSOLE, in architecture, a kind of little ſtory, ſometimes called a mezanzine, contrived occaſionally at the top of the firſt ſtory, for the convenience of a wardrobe, &c.

ENTERTAINMENT, in a theatrical ſenſe. See the article FARCE.

ENTHUSIASM, ενθυσιασμος, a tranſport of the mind, whereby it is led to think and imagine things in a ſublime, ſurpriſing, yet probable manner. This is the enthuſiaſm felt in poetry, oratory, muſic, painting, ſculpture, &c.

ENTHUSIASM, in a religious ſenſe, implies a tranſport of the mind, whereby it fancies itſelf inſpired with ſome revelation, impulſe, &c. from heaven. Mr. Locke gives the following deſcription of enthuſiaſm. "In all ages, men in whom "melancholy has mixed with devotion, "or whoſe conceit of themſelves has "raiſed them into an opinion of a great "familiarity with God, and a nearer "admittance to his favour than is af-"forded to others, have often flattered "themſelves with a perſuaſion of an im-"mediate intercourſe with the deity, "and frequent communications from "the divine ſpirit. Their minds being "thus prepared, whatever groundleſs "opinion comes to ſettle itſelf ſtrongly "upon their fancies, is an illumination "from the ſpirit of God, and preſently "of divine authority. And whatſoever "odd action they find in themſelves a "ſtrong inclination to do, that impulſe "is concluded to be a call or direction "from heaven, and muſt be obeyed. It "is a commiſſion from above, and they "cannot err in executing it. This I "take to be properly enthuſiaſm, which "though ariſing from the conceit of a "warm and overweaning brain, works "when it once gets footing more pow-"erfully on the perſuaſions and actions "of men, than either reaſon or revela-"tion, or both together. Men being "moſt forwardly obedient to the im-"pulſes they receive from themſelves." Devotion, when it does not lie under the check of reaſon, is apt to degenerate into enthuſiaſm. When the mind finds itſelf inflamed with devotion, it is apt to think that it is not of its own kindling, but blown up with ſomething divine within it. If the mind indulges this thought too far, and humours the growing paſſion, it, at leaſt, flings itſelf into imaginary raptures and ecſtacies; and when once it fancies itſelf under the influence of a divine impulſe, no wonder if it ſlights human ordinances, and refuſes to comply with the eſtabliſhed form of religion, as thinking itſelf directed by a much ſuperior guide.

ENTHUSIAST, a perſon poſſeſſed with enthuſiaſm. See the preceding article.

ENTHYMEME, ενθυμημα, among logicians, denotes a ſyllogiſm, perfect in the mind, but imperfect in the expreſſion, by reaſon one of the propoſitions is ſuppreſſed, as being eaſily ſupplied by the underſtanding of thoſe with whom we diſcourſe, e. g. *In every right-lined triangle, the three angles are juſt equal to two right ones; therefore, thoſe of an iſoſcles are ſo:* where the propoſition, *every iſoſcles is a right-lined triangle*, is omitted, as being ſufficiently known. But to give a more familiar example; ſuppoſe the enthymeme to be, *every man is mortal; therefore every king is mortal:* where the minor propoſition, *every king is a man*, is omitted for the reaſon already mentioned. There is a particular elegance in the enthymeme form of arguing, as leaving ſomewhat to the exerciſe and invention of the mind; for which reaſon it is very frequent, as well in common converſation, as in the moſt polite writers. It not only ſhortens diſcourſe, and adds a certain force and livelineſs to our reaſoning, but gives the reader a pleaſure not unlike that the author himſelf feels in compoſing. By this means we are put upon exerting ourſelves, and ſeem to ſhare in the diſcovery of what is propoſed to us.

ENTIER, in the manege, a reſty horſe that not only refuſes to turn, but reſiſts the hand;

hand: provided he flies or parts from the heels, you have a remedy for him, by uſing a caveſſon made after the duke of Newcaſtle's way.

ENTIERTY, or ENTIERTIE, among lawyers, ſignifies the whole of a thing, in contradiſtinction to a moiety; thus a bond, damages, *&c.* are ſaid to be entire, when they cannot be apportioned.

ENTIRE TENANCY, in law, is when the ſole poſſeſſion is in one perſon; in contradiſtinction to ſeveral tenancy, which is a joint or common poſſeſſion in two or more.

ENTITIVELY and ENTITY, among metaphyſicians. See the article ENS.

ENTOYER, in heraldry, denotes a bordure charged wholly with things without life: it ſeems to be a corruption of the french *entour*, round about.

ENTRAILS, the ſame with inteſtines. See the article INTESTINES.

ENTRANCE *of hounds*, among ſportſmen, denotes the inſtructing them how to hunt: for which purpoſe, it is proper to lead them through warrens and flocks of ſheep, to enure them to be under command, and to run at nothing without the huntſman's orders; and when the game appears, the young hounds are to be entered along with the beſt and ſtauncheſt hounds that can be got, and not one barking dog ſuffered to be near. The hare is the beſt game on ſuch an occaſion, becauſe, in this chaſe, the young hounds will learn all the doublings they can poſſibly meet with in any other kind. When the hare is killed, they muſt not be allowed to break her up; but the huntſman is to ſkin and cut her in pieces, with which the young hounds are to be rewarded.

ENTRE MINHO DOURO, a province of Portugal, having the river Minho on the north, Douro on the ſouth, and the Atlantic ocean on the weſt.

ENTRE TAYO and GUADIANA, a province of Portugal, having that of Eſtremadura on the north, and the Atlantic ocean on the weſt.

ENTREPAS, in the manege, a broken pace or going that is neither walk nor trot, but has ſomewhat of an amble.

This is the pace or gait of ſuch horſes as have no reins or back, and go upon their ſhoulders; or, of ſuch as are ſpoiled in their limbs.

ENTRING *a ſhip*, the ſame with boarding. See the article BOARDING.

ENTRING-LADDERS, in a ſhip, are of two ſorts; one uſed by the veſſel's ſides, in a harbour, or in fair weather, for perſons to go in and out of the ſhip: the other is made of ropes, with ſmall ſtaves for ſteps; and is hung out of the gallery to enter into the boat, or to come aboard the ſhip, when the ſea runs ſo high that they dare not bring the boat to the ſhip's ſide for fear of ſtaving it.

ENTRING-ROPES. See the article ROPE.

ENTROCHUS, in natural hiſtory, a genus of extraneous foſſils, uſually of about an inch in length, and made up of a number of round joints, which when ſeparate and looſe, are called trochitæ: they are compoſed of the ſame kind of plated ſpar with the foſſile ſhells of the echini, which is uſually of a bluiſh-grey colour, and are very bright where freſh broken; they are all ſtriated from the center to the circumference, and have a cavity in the middle. See plate XCIII. fig. 3.

The entrochi are found of all ſizes, from that of a pin's head to a finger's length, and the thickneſs of one's middle finger; and are plainly of marine origin, having often ſea-ſhells adhering to them. They ſeem to be the petrified arms of that ſingular ſpecies of the ſea-ſtarfiſh, called ſtella arboreſcens.

They are eſteemed very powerful diuretics, and preſcribed in nephritic caſes with good ſucceſs; the doſe being as much of the powder, as will lie on a ſhilling.

ENTRUSION, or INTRUSION, in law. See the article INTRUSION.

ENTRY, in law, ſignifies taking poſſeſſion of lands or tenements, where a perſon has a right ſo to do.

It is alſo uſed for a writ of poſſeſſion, which is of divers kinds, as, 1. A writ of *entry ſur diſſeiſin*, which lies for the diſſeiſee againſt the diſſeiſor. 2. A writ of *entry ſur diſſeiſin in le per*, that lies for the heir by deſcent, who ſucceeding in right of his anceſtor, is ſaid to be in the *per* or *pere*. 3. A writ of *entry ſur diſſeiſin in le per & cui*, which lies where the feoffee of the diſſeiſor makes a feoffment to another. 4. A writ of *entry ſur diſſeiſin in le poſt*, which lies where after a diſſeiſin the land is removed from one hand to another beyond the degrees, that a writ of entry can be made in the uſual form.

The writ of entry is put out of the degrees by five things. 1. Intruſion, as when the diſſeiſor dies ſeiſed, and a ſtranger enters. 2. Succeſſion, when the ſucceſſor in office or profeſſion enters. 3.

Diſſeiſin upon diſſeiſin, when the diſſeiſor is diſſeiſed by another. 4. Judgment, where a perſon recovers againſt the diſſeiſor. 5. Eſcheat, which is when the diſſeiſor dies without heir, or commits felony, &c. on which account the lord enters. In all which caſes, a diſſeiſee, or his heir, ſhall not have a writ of entry within the degrees of the *per*, but in the *poſt*.

There are ſeveral other writs of entry, which lie for the perſon in reverſion, where a tenant for life, for term of years, or by courteſy, aliens, and afterwards dies: and ſo in other caſes.

Forcible ENTRY. See FORCIBLE.

ENTRY, among ſportſmen, denotes the places or thickets through which deer are found lately to have paſſed.

Bill of ENTRY, in commerce. See BILL.

In making entries inwards, it is uſual for merchants to include all the goods they have on board the ſame ſhip in one bill, though ſometimes they may happen to be upwards of twenty ſeveral kinds; and in caſe the goods are ſhort entered, additional or poſt entries are now allowed; though formerly the goods, ſo entered, were forfeited. As to bills of entry outwards, or including goods to be exported, upon delivering them, and paying the cuſtoms, you will receive a ſmall piece of parchment called a cocket, which teſtifies your payment thereof, and all duties for ſuch goods. See the article EXPORTATION.

If ſeveral ſorts of goods are exported at once, of which ſome are free, and others pay cuſtoms, the exporter muſt have two cockets, and therefore muſt make two entries; one for the goods that pay, and the other for the goods that do not pay cuſtom.

Entries of goods, on which a drawback is allowed, muſt likewiſe contain the name of the ſhip in which the goods were imported, the importer's name, and time of entry inwards. The entry being thus made, and an oath taken that the cuſtoms for thoſe goods were paid as the law directs, you muſt carry it to the collector and comptroller, or their deputies; who, after examining their books, will grant a warrant, which muſt be given to the ſurveyor, ſearcher, or land-waiter, for them to certify the quantity of goods; after which the certificate muſt be brought back to the collector and comptroller, or their deputies, and oath made, that the ſaid goods are really ſhipped, and not landed again in any part of Great Britain. See the articles DRAWBACK and DEBENTURE.

ENVELOPE, in fortification, a work of earth, ſometimes in form of a ſimple parapet, and at others, like a ſmall rampart with a parapet: it is raiſed ſometimes on the ditch, and ſometimes beyond it. Envelopes are often made to incloſe a weak ground, where that is practicable, with ſingle lines, to ſave the great charge of horn-works and tenails, or where there is not room for ſuch large works. Some give the names of ſillon, counter-guard, conſerve, and lunette, to envelopes raiſed in the moat.

ENVIRONNE', in heraldry, ſignifies ſurrounded with other things: thus, they ſay, a lion environné with ſo many bezants. See the article BEZANT.

ENUMERATION, an account of ſeveral things, in which mention is made of every particular article.

ENUMERATION, in rhetoric, a part of peroration, in which the orator, collecting the ſcattered heads of what has been delivered throughout the whole, makes a brief and artful relation, or recapitulation thereof.

ENUMERATION *of the parts*, in rhetoric, is much the ſame with diſtribution. See the article DISTRIBUTION.

ENUNCIATION, a declaration of a thing either in terms of affirmation or denial.

ENUNCIATION, among logicians, the ſame with propoſition. See the article PROPOSITION.

ENVOICE, the ſame with invoice. See the article INVOICE.

ENVOY, a perſon deputed to negociate ſome affair with any foreign prince or ſtate. Thoſe ſent from the courts of France, Britain, Spain, &c. to any petty prince or ſtate, ſuch as the princes of Germany, the republics of Venice, Genoa, &c. go in quality of envoys, not embaſſadors; and ſuch a character only do thoſe perſons bear, who go from any of the principal courts of Europe to another, when the affair they go upon is not very ſolemn or important. There are envoys ordinary and extraordinary, as well as embaſſadors; they are equally the ſame under the protection of the law of nations, and enjoy all the privileges of embaſſadors, only differing from them in this, that the ſame ceremonies are not performed to them.

ENURE, in law, ſignifies to take effect, or avail: thus, they ſay, a releaſe made to a

tenant for life, shall enure, and be of force to the person in reversion.

ENURNY, in heraldry, is applied to a bordure charged with beasts.

ENVY, in ethics, is defined to be an uneasiness of the mind, caused by the consideration of a good we desire, obtained by one we think less worthy of it than ourselves.

EON, among anatomists, is sometimes used for the whole ambit of the eye.

Eon, or Æon, in church-history. See the article Æon.

EPACT, in chronology, a number arising from the excess of the common solar year above the lunar, whereby the age of the moon may be found out every year. See the articles Year and Moon.

The excess of the solar year above the lunar is 11 days; or the epact of any year expresses the number of days from the last new moon of the old year, which was the beginning of the present lunar year, to the first of January. The first year of the cycle of the moon, the epact is 0, because the lunar year begins with the solar. On the second, the lunar year has begun 11 days before the solar year, therefore the epact is 11. On the third, it has begun twice 11 before the solar year, therefore the epact is 22. On the fourth, it begins three times 11 days sooner than the solar year, the epact would therefore be 33; but 30 days being a synodical month, must that year be intercalated; or that year must be reckoned to consists of thirteen synodical months, and there remains three, which is the true epact of the year; and so on to the end of the cycle, adding 11 to the epact of the last year, and always rejecting 30, gives the epact of the present year. Thus to adjust the lunar year to the solar, through the whole of 19 years, 12 of them must consist of 12 synodical months each, and 7 of 13, by adding a month of 30 days to every year when the epact would exceed 30, and a month of 29 days to the last year of the cycle, which makes in all 209 days, *i. e.* 19 × 11; so that the intercalary or embolimæan years in this cycle are 4, 7, 10, 12, 15, 18, 19. See the article Cycle.

If the new moons returned exactly at the same time after the expiration of nineteen years, as the council of Nice supposed they would do (when they fixed the rule for the observation of easter, and marked the new moons in the calendar for each year of the lunar cycle) then the golden number multiplyed by 11, would always give the epact. But in a julian century, the new moons anticipate, or happen earlier than that council imagined they would, by $\frac{8}{25}$ of a day. In a gregorian common century, which is one day shorter than a julian century, they happen $\frac{17}{25}$ of a day later, (1 day $- \frac{8}{25} = \frac{17}{25}$). Now $\frac{17}{25} \times 3 = \frac{51}{25}$ for the three common centuries, but $\frac{8}{25}$ being subtracted, on account of the gregorian bissextile century, there will remain $\frac{43}{25}$. Therefore in four gregorian centuries, the new moons will happen later by $\frac{43}{25}$ of a day, and the epacts must be decreased accordingly.

At present the gregorian epact is 11 days short of the julian epact; but the quotient of the number of the centuries divided by 4, which at this time is 4, multiplied by $\frac{43}{25}$, with the addition of the remainder 1 multiplied by $\frac{17}{25}$, makes in all but $\frac{189}{25}$, or 7 days $+ \frac{14}{25}$, therefore $\frac{86}{25}$, *i. e.* 3 days $+ \frac{11}{25}$ must be added to complete the 11 days. Whence we have the following

General rule for finding the gregorian Epact *for ever.* Divide the centuries of any year of the christian æra by 4, (rejecting the subsequent numbers;) multiply the remainder by 17, and to this product add the quotient multiplyed by 43; divide the product + 86 by 25; multiply the golden number by 11, from which subtract the last quotient; and rejecting the thirties, the remainder will be the epact.

Example for 1754.

$17 \div 4 = 4$ remains 1
$1 \times 17 = 17$
$43 \times 4 + 86 + 17 = 275$
$275 \div 25 = 11$
11×7 (G. N°.) $= 77$
$77 - 11 = 66$
$66 - 60$ $(2 \times 30) = 6 =$ Epact.

A shorter rule for finding the epact until the year 1900. Subtract 1 from the golden number, and multiplying the remainder by 11, reject the thirties, and you have the epact.

Example for the year 1754.

G.N. = 7

G.N. 7 — 1 × 11 = 66   1

66 — twice 30 = 6 = Epact.   6

11

30)66(2

6 = Ep.

A table of golden numbers, and their corresponding epacts, till the year 1900.

G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.
1	0	6	25	11	20	16	15
2	11	7	6	12	1	17	26
3	22	8	17	13	12	18	7
4	3	9	28	14	23	19	18
5	14	10	9	15	4		

EPANORTHOSIS, in rhetoric, a figure by which a perſon corrects, or ingeniouſly revokes what he juſt before alledged, as being too weakly expreſſed, in order to add ſomething ſtronger, and more conformable to the paſſion with which he is agitated.

The epanorthoſis is diſtinguiſhed into two kinds, the one is when we correct or revoke the word, as in the following example of the apoſtle, *but I laboured more abundantly than they all: yet not I, but the grace of God, which was with me.* 1 Cor. xv. 10. where what he firſt attributed to his own merit, he chuſes afterwards to call the work of grace, as being the principal cauſe. The ſecond kind of epanorthoſis, is when we correct or revoke the ſentiment, as in the following of Cicero: *Italiam ornare, quam domum ſuam, maluit: quamquam, Italia ornata, domus ipſa mihi videtur ornatior.*

EPARER, in the manege, ſignifies the flinging of a horſe, or his yerking and ſtriking with his hind legs. See the article YERKING.

In caprioles, a horſe muſt yerk out behind with all his force; but in ballotades, he ſtrikes but half out; and, in croupades, he does not ſtrike out his hind legs at all. All ſuch yerking horſes are reckoned rude. See the articles CAPRIOLES, BALLOTADE, &c.

EPAULE, in fortification, denotes the ſhoulder of a baſtion, or the place where its face and flank meet, and form the angle called the angle of the ſhoulder. See the article BASTION.

EPAULEMENT, in fortification, a work raiſed to cover ſidewiſe, is either of earth, gabions, or faſcines, loaded with earth. The epaulements of the places of arms for the cavalry, at the entrance of the trenches, are generally of faſcines mixed with earth.

EPAULEMENT alſo denotes a maſs of earth, called likewiſe a ſquare orillon from its figure, raiſed to cover the cannon of a caſemate, and faced with a wall.

It is likewiſe uſed for any work, thrown up to defend the flank of a poſt, or other place.

EPENTHESIS, in grammar, the interpoſition or inſertion of a letter or ſyllable in the middle of a word, as *alituum,* for *alitum*; *relligio,* for *religio*; *induperator,* for *imperator,* &c.

EPERLANUS, in ichthyology, the name uſed by authors for the oſmerus, with ſeventeen rays in the fin beſide the anus, and called in engliſh the ſmelt. See the article OSMERUS.

EPERON, the SPUR-SHELL, in natural-hiſtory. See the article SPUR SHELL.

EPHA, or EPHAH, in jewiſh antiquity, a meaſure for things dry, containing 1. 0961 of a buſhel. See MEASURE.

EPHEDRA, the SEA-GRAPE, or SHRUB HORSE-TAIL, in botany, a genus of the dioecia-ſyngeneſia claſs of plants, which has no corolla or flower-petals: the ſtamina are ſeven filaments, coaleſcing into a ſubulated column; the antheræ are roundiſh, three being ſuperior, and the other four inferior: the ſeeds are acutely oval, convex on one ſide, and plain on the other, and contained in a baccated cup.

The fruit is red, ſucculent, and of an acid auſtere taſte: its juice, taken in wine, is ſaid to be good for the coeliac paſſion and fluor albus.

EPHEMERA, in medicine, the name of a ſpecies of fever continuing the ſpace of one day, or ſometimes more; for the medical writers expreſs themſelves by *ephemera ſimplex, vel plurium dierum.* See the article FEVER.

This ſpecies of fever has this peculiar to it, that the pulſe is at firſt large, but as it becomes afterwards moderately quick and frequent, ſo it is equal, ſoft, and regular, as in a natural ſtate. The urine undergoes little or no change, nor is the diſorder preceded by a loathing of food, a ſpontaneous laſſitude of the body, diſturbed ſleep, preternatural yawning, or horror; but it ſeizes the patient ſuddenly, and afflicts him with no other ſymptoms than a pain of the head and ſtomach, a nauſea, heat and reſtleſneſs. The perſons moſt ſubject to this fever, are young men who have much blood, and feed heartily,

heartily, and fuch as have had any habitual difcharge of blood ftopped upon them, whether natural, as in the hæmorrhoidal or menftrual difcharges, or artificial, fuch as frequent bleeding, cupping, and the like. And thofe who have thrown their blood into violent emotions by the too free ufe of fpirituous liquors, too violent exercife, unufual watchings, long ftay by large fires, a fudden repreffion of fweats by cold water, or by violent paffions, particularly anger. In the treatment of this fever, the proper courfe is to attemperate the violent motions of the blood with nitrous and the fixed antimonial medicines, and occafionally with gentle acids. Sweat is to be promoted. Nitre, crabs-eyes, *&c.* may be prefcribed in fmall dofes every three or four hours; and towards night, fudorifics fhould be joined to thefe, fuch as the contrayerva-root, or the like. The ephemera, properly fo called, differs in nothing except the time of its duration, from that which commonly lafts four days.

EPHEMERA MALIGNA, is alfo a term by which fome authors have called the fudor anglicanus, or malignant diary fever, which generally deftroyed the patient in twenty-four hours. See the article SUDOR ANGLICANUS.

EPHEMERA, the DAY-FLY, in zoology, a genus of flies belonging to the neuroptera order, and fo called from their living only one day and a night: they are about the fize of the leffer houfe-flies, and have two gibbous protuberances on the top of the head, refembling eyes: add to this, that the tail is furnifhed with hairs, and the antennæ are fhort.

Of this genus there are feveral fpecies, diftinguifhed by their different colours, and the number of hairs in their tail; fome having two, and others three.

EPHEMERIDES, in literary hiftory, an appellation given to thofe books or journals, which fhew the motions and places of the planets for every day in the year.

It is from the tables contained in thefe ephemerides, that eclipfes, and all the variety of afpects of the planets, are found. See the articles ECLIPSE, CONJUNCTION, OPPOSITION, *&c.*

EPHESUS, an antient city of Ionia in the leffer Afia, fituated, eaft long. 27° 40′, north lat. 37° 5′, near the fea, on the mouth of the river Cauftrus, which formed a commodious harbour. It was the capital of Afia during the roman government; and here ftood the fo much celebrated temple of Diana.

EPHIALTES, εφιαλτης, in medicine, the fame with the incubus, or night-mare. See the article INCUBUS.

EPHIPPIUM, in anatomy, the fame with the cella turcica, being a part of the os fphenoides. See the article SPHENOIDES.

EPHOD, in jewifh antiquity, one part of the prieftly habit; being a kind of girdle which, brought from behind the neck over the two fhoulders, and hanging down before, was put crofs the ftomach, then carried round the wafte, and made ufe of as a girdle to the tunic.

There were two forts of ephods, one of plain linen for the priefts, and the other embroidered for the high prieft. Of this laft Mofes gives an ample defcription. It was compofed of gold, blue, purple, crimfon and twifted cotton. Upon part of it, which paffed over the fhoulders, were two large precious ftones, one on each fhoulder: upon thefe were engraven the names of the twelve tribes, fix upon each ftone.

The ephod was peculiar to the priefthood, and thought effential to their character; it being the opinion of the Jews, that no worfhip, true or falfe, could fubfift without a priefthood and ephod.

EPHORI, εφοροι, in grecian antiquity, magiftrates eftablifhed in antient Sparta to balance the regal power. The authority of the ephori was very great. They fometimes expelled and even put to death the kings, and abolifhed or fufpended the power of the other magiftrates, calling them to account at pleafure. There were five of them, others fay nine. They prefided in the public fhews and feftivals. They were entrufted with the public treafure, made war and peace, and were fo abfolute, that Ariftotle makes their government equal to the prerogative of a monarchy. They were eftablifhed by Lycurgus.

EPIBATERION, επιβατηριον, in antient poetry, a poem rehearfed at a perfon's return from a voyage, thanking the immortal gods for his prefervation.

EPIC, or HEROIC POEM, a poem expreffed in narration, formed upon a ftory partly real, and partly feigned; reprefenting, in a fublime ftile, fome fignal and fortunate action, diftinguifhed by a variety of great events, to form the morals, and affect the mind with the love of heroic virtue. See the article POEM.

We may diftinguifh three parts of the definition, namely, the matter, the form, and the end. The matter includes the action of the fable, under which are ranged

ed the incidents, episodes, characters, morals, and machinery. The form comprehends the way or manner of the narration, whether by the poet himself, or by any persons introduced, whose discourses are related: to this branch likewise belong the moving of the passions, the descriptions, discourses, sentiments, thoughts, stile, and versification; and besides these, the similies, tropes, figures, and, in short, all the ornaments and decorations of the poem. The end is to improve our morals, and increase our virtue. See the articles ACTION, FABLE, EPISODE, CHARACTER, &c.

There are two things which chiefly distinguish epic from tragedy, the manner of the representation, and the event or catastrophe. As to the former it is certain that tragedy is formed upon action, and epic upon narration. This is the principal character in an heroic poem, and a very difficult part of it. The qualities a narration must have to be perfect, are these: it must be short and succinct, that nothing may be idle, flat, or tedious: it must be lively, quick, and delightful: it must be simple and natural. The most ordinary graces of a narration, must come from the figures, the transitions, and from all those delicate turns that carry the reader from one thing to another, without his regarding it. It must never point out all the matter, that some may be left for the natural reflections of the reader. It must likewise avoid the particulars and length of affected descriptions. Lastly, the narration must be delightful, not only by the variety of things it relates, but by the variety of its numbers. It is this variety that makes the greek versification more harmonious and more proper for narration than the Latin.

Epic also differs from tragedy in the event, or conclusion. In tragedy, the conclusion is generally unfortunate, but never so in epic: the reasons of which rule are the examples of Homer and Virgil, who are, and ought to be, our guides and patterns in this particular, and in which they have been universally followed by all who would have been thought epic writers; and not only their authority, but the very reason of the thing supplies us with arguments for this rule. 1. Although in tragedy, where the action is much shorter, more simple, and finished, as it were, at a heat, an unfortunate conclusion may be so far from displeasing, that it may be more agreeable to the audience: yet in epic, after such a series and variety of adventures, after sustaining so many and such great difficulties, the reader must be out of humour with the poet, unless the whole should conclude happy at last. 2. The chief end of tragedy is to excite the passions, especially those of terror and pity, by a short and brisk emotion; but the design of an epic poem is, by more slow and leisure operations, to remove bad habits, and restore good ones; to subdue vice and recommend virtue, which would be done with a very ill grace, if the hero of the poem should come to a deplorable end. 3. An epic poem, properly so called, is, and should be, written in honour of the country and religion of the author, between which and the hero there is a near relation; and therefore he ought to come off in triumph at last. These two differences are, as the schools call them, specific differences, being so in nature: the others are only accidental, being differences in degree, extent, and greatness. Although epic poetry is directed to the morals and the habit rather than the passions, yet it likewise has passions, but in an inferior degree to tragedy: for though it has a mixture of all the passions, yet joy and admiration are the most essential to it.

An epic poem must be formed upon a story partly real and partly fictitious. In tragedy, which is much shorter, the performance may not only be excusable, but commendable, though the whole fable should be fictitious; but in such a long work as that of an epic poem, the reader will be tired unless he has the pleasure of finding some truth interwoven with the fable.

The moderns seem to mistake that part of the epic and tragedy which contain the wonderful, confounding it with improbable, and using the two words promiscuously. If it was really so, the wonderful would be always faulty; for that is always so which is improbable. The great art is a just temperament and mixture of both, to make it natural and probable. Scarce any of the poets but Virgil had the art, by the preparation of incidents, to manage the probability in all the circumstances of an epic poem. Homer is not altogether so scrupulous and regular in his contrivances: his machines

chines are lefs juft, and all his meafures, to fave the probability, are lefs exact. Laftly, the fovereign perfection of an epic poem, in the opinion of Ariftotle, confifts in the juft proportion and perfect connection of all the parts. It is not fufficient that all be grand and magnificent in an epic poem, but all muft be juft, uniform, and proportionable, in the different parts that compofe it.

This is all that can be obferved moft effential to an epic poem: little need be faid about the machinery, which, among the antient heathens, was the agency of their falfe gods, and of angels and dæmons among us chriftians: its beauty and magnificence are well known. The dignity of an epic poem would fcarce be kept up without it, efpecially fince the marvellous depends on it. The verfification of epic poetry, among the Greeks and Romans, confifted of hexameters, a fort of verfe fo peculiar to epic, that when it is ufed upon other occafions, it is called heroic verfe. Our englifh verfe comes neareft to it both in gravity and majefty, but at how great a diftance! See the article HEXAMETER.

An epic or heroic poem, is the beft and moft perfect kind of poetry; it is the greateft work which the foul of man is capable of performing; and here it is the utmoft bounds are fet to human compofition. All the noblenefs and the elevation of the moft perfect genius, can hardly fuffice to form fuch a one as is requifite for an heroic poet: the difficulty of finding together fancy and judgment, heat and imagination, and fobriety of reafon, precipitation of fpirit, and folidity of mind, renders this character fo very rare: it requires great images, and yet a greater wit to form them. There muft be a judgment fo folid, a difcernment fo exquifite, fuch perfect knowledge of the language in which he writes, fuch obftinate ftudy, profound meditations, and vaft capacity, that fcarce whole ages can produce one genius fit for an epic poet: even among the antients themfelves, if we except Homer and Virgil, we fhall fcarce find one that is truly an epic poet.

EPICARPIUM, in antient pharmacy, denotes a remedy applied in form of a plafter to the wrifts, for intermitting fevers: it confifted of penetrating ingredients, as garlic, onion, camphor, *&c.*

EPICEDIUM, ἐπικήδιον, in antient poetry, a poem rehearfed during the funeral folemnity of perfons of diftinction. See the article NENIA.

We find two beautiful epicediums in Virgil, one of Euryalus, and the other of Pallas.

EPICERASTICS, in pharmacy, denote much the fame with emollients. See the article EMOLLIENTS.

Epiceraftic medicines obtund the acrimony of the humours, and mitigate the uneafy fenfation thence arifing.

To this clafs belong, 1. The emollient roots, as marfhmallow, liquorice, *&c.* 2. The leaves of mallows, water-lilly, the large houfe-leek, purflain and lettuce. 3. The feeds of barley decorticated, henbane, lettuce, flax, white poppy, and rue. 4. Fruits, as jubebs, raifins, fweet apples, prunes, and fweet almonds. 5. Cooling juices, whites of eggs, whey, oils, fyrup, and fugar of violets, *&c.*

EPICHIREMA, ἐπιχείρημα, in logic, a mode of reafoning, which comprehends the proof of one or both the premifes of a fyllogifm, before the conclufion is drawn.

EPICOENE, in grammar, a term applied to nouns, which, under the fame gender and termination, mark indifferently the male and female fpecies. See GENDER.

Thefe nouns are otherwife called *promifcua*, and comprehend the names of a great number of the wild beafts, more of the wild fowls, and almoft all the fifhes, whereof the difference of fexes is either difficult to be difcerned, or is rarely adverted to; fuch are, in Latin, *elephantus*, *paffer*, *aquila*, *falmo*, which equally fignify a male or female elephant, fparrow, eagle, or falmon. As often as either of the fexes, are to be diftinctly mentioned, it is generally done by prefixing to the word male *(mas)* or female *(femina.)*

EPICUREAN PHILOSOPHY, the doctrine or fyftem of philofophy maintained by Epicurus and his followers.

Epicurus, the Athenian, one of the greateft philofophers of his age, was obliged to Democritus for almoft his whole fyftem, notwithftanding he piqued himfelf upon deriving every thing from his own fund. He wrote a great number of books, which are made to amount to above 300. Though none of them are come down to us, no antient philofopher's fyftem is better known than his, for which we are moftly indebted to the great Lucretius, Diogenes Laertius, and Tully. His philofophy confifted of three parts, canonical,

canonical, phyfical, and etherial. The firft was about the canons, or rules of judging. The cenfure which Tully paffes upon him for his defpifing logic, will hold true only with regard to the logic of the ftoics, which he could not approve of, as being too full of nicety and quirk. Epicurus was not acquainted with the analytical method of divifion and argumentation, nor was he fo curious in modes and formation as the ftoics. Soundnefs and fimplicity of fenfe, affifted with fome natural reflections, was all his art. His fearch after truth proceeded only by the fenfes, to the evidence of which he gave fo great a certainty, that he confidered them as an infallible rule of truth, and termed them the firft natural light of mankind.

In the fecond part of his philofophy he laid down atoms, fpace, and gravity as the firft principles of all things: he did not deny the exiftence of a God, but thought it beneath his majefty to concern himfelf with human affairs: he held him a bleffed, immortal being, having no affairs of his own to take care of, and above meddling with thofe of others. See ATOM and ATOMICAL.

As to his ethics, he made the fupreme good of man to confift in pleafure, and confequently fupreme evil in pain. Nature, itfelf, fays he, teaches us this truth, and prompts us from our birth to procure whatever gives us pleafure, and avoid what gives us pain. To this end he propofes a remedy againft the fharpnefs of pain: this was to divert the mind from it, by turning our whole attention upon the pleafures we have formerly enjoyed: he held that the wife man muft be happy, as long as he is wife; that pain, not depriving him of his wifdom, cannot deprive him of his happinefs.

There is nothing that has a fairer fhew of honefty than the moral doctrine of Epicurus. Gaffendus pretends, that the pleafure in which this philofopher has fixed the fovereign good, was nothing elfe but the higheft tranquility of mind in conjunction with the moft perfect health of body: but Tully, Horace, and Plutarch, as well as almoft all the fathers of the church, give us a very different reprefentation: indeed the nature of this pleafure, in which the chief happinefs is fuppofed to be feated, is a grand problem in the morals of Epicurus. Hence there were two kinds of Epicureans, the rigid and the remifs: the firft were thofe who underftood Epicurus's notion of pleafure in the beft fenfe, and placed all their happinefs in the pure pleafures of the mind, refulting from the practice of virtue. The loofe or remifs Epicureans, taking the words of that philofopher in a grofs fenfe, placed all their happinefs in bodily pleafures, or debauchery. Thus we have the whole myftery of this celebrated doctrine. It was innocent in expreffion, but criminal in thought; it had a beautiful outfide, but it was all corruption within. Thefe loofe philofophers took up a feeming aufterity to difguife their fecret indulgence, and all their fchemes of morality were but fo many veils for their immoral behaviour.

EPICYCLE, ἐπίκυκλος, in the antient aftronomy, a little circle whofe center is in the circumference of a greater circle; or it is a fmall orb, or fphere, which being fixed in the deferent of a planet, is carried along with it; and yet, by its own peculiar motion, carries the planet faftened to it round its proper center.

It was by means of epicycles, that Ptolemy and his followers folved the various phænomena of the planets, but more efpecially their ftations and retrogradations. See the articles PTOLEMAIC SYSTEM, STATIONARY, and RETROGRADATION.

The great circle they called the excentric or deferent, and along its circumference the center of the epicycle was conceived to move; carrying with it the planet fixed in its circumference, which in its motion downwards proceeded according to the order of the figns, but, in moving upwards, contrary to that order. The higheft point of a planet's epicycle they called apogee, and the loweft perigee. See the articles APOGEE and PERIGEE.

EPICYCLOID, in geometry, a curve generated by the revolution of the periphery of a circle, A C E (plate LXXXVIII. fig. 3) along the convex or concave fide of the periphery of another circle, D G B.

The length of any part of the curve, that any given point in the revolving circle has defcribed, from the time it touched the circle it revolved upon, fhall be to double the verfed fine of half the arch, which all that time touched the circle at reft, as the fum of the diameters of the circles, to the femidiameter of the refting circle, if the revolving circle moves upon the convex fide of the refting circle; but if upon the concave fide, as the difference of

of the diameters to the femidiameter of the refting circle.

In the Philofophical Tranfactions, n° 218, we have a general propofition for meafuring the areas of all cycloids and epicycloids, *viz.* The area of any cycloid or epicycloid is to the area of the generating circle, as the fum of double the velocity of the center and velocity of the circular motion to the velocity of the circular motion: and, in the fame proportion, are the areas of fegments of thofe curves to thofe of analogous fegments of the generating circle.

EPIDEMIA, επιδημια, in grecian antiquity, feftivals kept in honour of Apollo and Diana, at the ftated feafons when thefe deities, who could not be prefent every where, were fuppofed to vifit different places, in order to receive the vows of their adorers.

The feftival took its name epidemia, from επι, among, and δημος, people; on account of the imaginary prefence of thofe deities among the people.

EPIDEMIA is alfo ufed for private feafts, or rejoicings, on account of the fafe return of a friend from a voyage or journey.

EPIDEMIC, among phyficians, an epithet of difeafes which at certain times are popular; attacking great numbers at or near the fame time. See the article DISEASE.

Epidemic difeafes differ from thofe called endemic. See the article ENDEMIC.

Boerhaave obferves, that though every particular difeafe, in various epidemical conftitutions, appear, to unattentive obfervers, the fame with regard to their names, figns, and confequences in fome meafure; yet to the judicious, they will appear quite otherwife, fo as to require a different adminiftration of the non-naturals, different treatment, and different medicines. This variety, however, in epidemical difeafes, is fo obfcure, that phyficians have not yet been able to deduce it from any abufe of non-naturals: and yet there are many circumftances which make it highly probable, that the caufes refide in the air, but depend more upon the inexplicable variety of exhalations contained therein, which, by their mixture with the fluids of the body, or their ftimulus, injure the human machine, than upon any change in the fenfible qualities thereof. See the article EFFLUVIUM.

Upon the invafion of any unknown epidemical diftemper, the phyfician will receive fome information with refpect to the cure: 1. By reducing the diftemper to fome more known kind, which it moft refembles. 2. By obferving its tendency at the vernal and autumnal equinoxes; at which feafons it is generally moft prevalent. 3. By attending to the fpontaneous phænomena, which precede, accompany, or follow the death or recovery of the patient, and the better or worfe ftate of the diforder. 4. By diligently remarking the benefit or injury received, from whatever the patients are unavoidably obliged to do; and from whatfoever is taken into, or difcharged out of the body. 5. By comparing the cafes of a great many patients, labouring under the diftemper at the fame time. 6. By abftaining from all remedies which are dubious, which irritate and induce a confiderable change in the humours, and thereby obfcure the nature and tendency of the difeafe.

According to Van Swieten, the origin of epidemic fevers, and we may add of other epidemical diforders, is always from fome caufe in common to the whole people who inhabit any particular place: thus, for example, when in befieged cities the fcantinefs of the market obliges all to ufe an ill courfe of diet; hence it is, that they have ufually the fame courfe and fymptoms, in different patients, and therefore require the fame method of cure. See FEVER, POX, *&c.*

EPIDENDRA, in botany, a term ufed by fome naturalifts for the parafitical plants, or thofe which grow on trees, fhrubs, and other vegetables: fuch are misletoe, dodder, *&c.* See the articles MISLETOE, DODDER, *&c.*

EPIDENDRUM, VANILLA, in botany, a genus of the gynandria diandria clafs of plants, the flower of which confifts of five very long and patent petals: the ftamina are two very fhort filaments, growing upon the piftil: the fruit is a very long, rounded, and carnofe pod, containing a multitude of minute feeds.

EPIDERMIS, in anatomy, the fame with the cuticle. See the article CUTICLE.

EPIDIDYMUS, in anatomy, the name by which fome call each of the two bodies more ufually known by that of paraftata. See the article PARASTATÆ.

EPIGÆA, in botany, a genus of the decandria monogynia clafs of plants, the calyx of which is a double permanent perianthium; the corolla confifts of a fingle cup-fafhioned petal; the fruit is a globular,

lar, depreſſed, five-cornered capſule, conſiſting of five valves, and containing five cells; the ſeeds are numerous and roundiſh, and the receptacle large, and divided into five parts.

EPIGASTRIC REGION, a part or ſubdiviſion of the abdomen. See the article ABDOMEN.

EPIGASTRIC VESSELS, the arteries and veins belonging to the epigaſtric region; the former being branches of the coeliac artery, and the latter of the iliac veins. See the articles ARTERY and VEIN.

EPIGLOTTIS, in anatomy, one of the cartilages of the larynx, or wind-pipe. It is often of the ſhape of an ivy-leaf, and joined to the thyroide cartilage; over which it appears erect, immediately behind the root of the tongue; to which it is alſo connected by its middle ligament, by two lateral ones to the cornua of the os hyoides, and by two poſterior ones, to the arytænoide cartilage. In the act of ſwallowing, it covers the glottis, or aperture of the larynx, and prevents any thing getting into it. See the articles LARYNX and GLOTTIS.

EPIGRAM, in poetry, a ſhort poem or compoſition in verſe, treating only of one thing, and ending with ſome lively, ingenious, and natural thought or point.

Epigram originally ſignified the ſame as inſcription, it being uſual among the antients to cut inſcriptions upon columns, walls, ſtatues, trophies, ſhields, *&c.* which inſcriptions, when expreſſed in poetical conceits, were afterwards termed epigrams. In proceſs of time, other poems of the like nature went by the name of epigrams, from their affinity with thoſe inſcriptions, and people began to uſe them for the relating of little facts and accidents, the characterizing of perſons, *&c.*

The chief characteriſtics of the epigram are acuteneſs and facetiouſneſs. It ſhould only tend to one point, which is always to be expreſſed with ſtrength and poignancy in the laſt verſe, excepting ſome that are more remarkable for their ſoftneſs and delicacy, or ſome other elegance. But above all things, a redundancy, or ſuperfluity of expreſſion, is to be avoided. Authors are much divided as to the length of an epigram. There are inſtances both among the antients and moderns of very long ones, but ſtill it is allowed, that the ſhorter are the better, as ſeeming moſt natural to this kind of poem. The greek epigrams run upon a turn of thought which is natural, but fine and ſubtile. They have nothing that bite, yet they are not inſipid except a few, which are quite flat and ſpiritleſs. We ſpeak of theſe collected in the anthology. The latin epigram, by a falſe taſte that prevailed in the beginning of the decay of pure latinity, endeavours to ſurprize the reader by a point. Catullus wrote after the greek manner, for he endeavours to cloſe a natural thought with a delicate turn of words, and with the ſimplicity of a very ſoft expreſſion. Martial was in ſome meaſure the author of the other way. Boileau ſays, the fineſſe and ſubtility of the epigram ſhould turn upon the words, rather than the thoughts, by which means he reduces it to the nature of a pun, or equivoque. See the article PUN.

EPIGRAPHE, επιγραφη, among antiquarians, denotes the inſcription of a building, pointing out the time when, the perſons by whom, the uſes, and the like, for which it was erected.

EPILEPSY, επιληψια, in medicine, the ſame with what is otherwiſe called the falling-ſickneſs, from the patient's falling ſuddenly to the ground.

Sometimes this diſeaſe comes upon the patient unawares; but it more frequently gives notice of its approach, by a laſſitude of the whole body, a heavy pain in the head, with ſome diſturbance of the ſenſes, unquiet ſleep, unuſual dread, dimneſs of ſight, and a noiſe in the ears: in ſome there is a violent palpitation of the heart, a puffing or inflation of the breaſt, difficult reſpiration, a murmuring noiſe in the belly, fœtid ſtools, a flux of the urine, and a refrigeration of the joints: in others, there is a ſenſation, as it were, of cold air, aſcending from the extreme parts towards the brain and heart. At length falling ſenſeleſs to the ground, the thumbs are ſhut up cloſe in the palms of the hands, and are with difficulty taken out: the eyes are diſtorted or inverted, ſo as nothing but the whites appear: all ſenſation is ſuſpended, inſomuch that no ſmell, no noiſe, nor even pinching of the body is able to bring them to themſelves: they frothe at the mouth, with a hiſſing kind of noiſe; the tongue is lacerated, or torn by the teeth, and there is a ſhaking or trembling of the joints. However, in different patients, the ſymptoms vary; for ſometimes inſtead of convulſive motions, the limbs are all ſtiff, and the patient is as immoveable as a ſtatue: in

in infants, the penis is erected; and, in young men, there is an emiſſion of the ſemen, and the urine ſometimes ſtreams out to a great diſtance. At laſt there is a remiſſion of the ſymptoms, and the patients come to themſelves after a longer or ſhorter interval; then they complain of a pain and heavineſs of the head, and a laſſitude of all their joints.

Theſe fits uſually return on certain days, or age of the moon, but eſpecially about the new or full moon; in women chiefly about the time of menſtruation; and as to the prognoſtics, they generally leave the patient about the time of puberty.

As to the cure, in adults or grown perſons, it is extremely difficult; but, in children, it is juſt the reverſe. Bliſters laid on the back part of the head are of great uſe a little before the fit is expected; which may the more certainly be foreknown, as this diſeaſe is influenced by the moon. The moſt proper medicines to correct the juices ſeem to be native cinnabar, and wild valerian root; a dram of which may be taken morning and evening for three or four months, and afterwards two or three days before the new and full moon. Or, two ſcruples of the powder of wild valerian-root, mixed with one of that of native cinnabar, may be taken morning and evening. Ambergreaſe and muſk are alſo accounted excellent.

It muſt not however be forgot, that this diſeaſe owes its origin to ſo many different cauſes, and is bred in ſo many different conſtitutions of the body, that the ſame remedy which ſucceeds in one caſe, often fails in another; and, therefore, different medicines are to be tried, eſpecially in adults. In caſe of a plethora, bleeding in the ankles will be proper. If the humours be in fault, cathartics, iſſues, cauteries, and bliſters muſt be uſed. If in children, it proceeds from gripes, or the breeding of teeth, nothing is better than to cleanſe the belly by milk clyſters, with a little venice-ſoap diſſolved in them. Some epileptic powder with cinnabar, or extract of rhubarb, and made into an electuary with ſyrup of roſes and manna, may likewiſe be given in proper doſes.

During the fit, too free an uſe of volatiles, ſpirituous liquors, and ſtrong ſmells are hurtful, as cauſing the humours to flow too much to the head. The beſt method is to place the patient in an erect poſture, and to rub the hands and feet pretty briſkly; and the beſt drink is pure water, which will mitigate, if not cure, the ſymptoms.

When the diſeaſe is cauſed by external violence, or extravaſations of humours in the head, cinnabar reduced into an impalpable powder, and given in large doſes with other cephalics and diaphoretics, has a kind of ſpecific virtue.

According to Dr. Cheyne, a milk-diet will cure the moſt inveterate epilepſy. Miſletoe is alſo ſaid to cure it, as ſure as the bark does an intermitting fever: its doſe, to grown people, is half a dram or more, in powder, to be taken every ſixth hour, drinking after it a draught of a ſtrong infuſion of the ſame plant; and if to every ounce of the powder, a dram of aſſa fœtida be added, the medicine will be ſtill more effectual. Cinnabar of antimony is alſo greatly celebrated for the cure of this diſeaſe, and may be taken from four grains to a ſcruple, in conſerve of roſemary-flowers.

If the diſeaſe is inveterate, ſome adviſe to give the following pills for a month, *viz.* Take caſtor and gum ammoniac, of each eight grains; wild valerian-root, half a ſcruple; ſalt of tartar, ſeven grains; and as much of tincture of caſtor as is ſufficient to form them into pills, one of which makes a doſe. On every ſeventh day, a cathartic ſhould be given; and ſometimes, inſtead of the caſtor and gum, filings of ſteel may be ſubſtituted.

A decoction of guaiacum, or ſaſſafras, taken twice a day, ſix or eight ounces at a time, and continued for thirty or forty days, is alſo ſaid to cure the epilepſy; eſpecially, if male piony-root, or the like, be added.

The following electuary is alſo recommended as a moſt excellent and certain anti-epileptic: take of peruvian bark, pulveriſed, ſix drams; of virginia ſnake-root, likewiſe pulveriſed, two drams; and of the ſyrup of piony-flowers, as much as is ſufficient to make a ſoft electuary. The doſe, after proper evacuations, in adults, is a dram; which ſhould be taken morning and evening for three or four months; and afterwards only repeated three or four days before the new and full moon.

EPILOBIUM, in botany, the WILLOW-HERB, a genus of the octandria-monogynia claſs of plants, the corolla whereof conſiſts of four roundiſh patent petals, ſomewhat emarginated: the fruit is a very long capſule of a cylindraceous form, ſtriated,

ſtriated, made up of four valves, and containing four cells: the ſeeds are numerous, oblong, and crowned with down.

EPILOGUE, in oratory, the end or concluſion of a diſcourſe, ordinarily containing a recapitulation of the principal matters delivered. See PERORATION.

EPILOGUE, in dramatic poetry, a ſpeech addreſſed to the audience after the play is over, by one of the principal actors therein, uſually containing ſome reflections on certain incidents in the play, eſpecially thoſe in the part of the perſon that ſpeaks it.

The epilogue is but of modern date, much later than the prologue: ſeveral have taken the exodium of the Greek drama for an epilogue; but it appears that they are very different; as the exodium was the laſt of the four parts of the tragedy, containing the unravelling the plot, anſwering to the laſt act of modern tragedy.

In the modern tragedy the epilogue has uſually ſomewhat of pleaſantry, intended, in all probability, to compoſe the paſſions raiſed in the courſe of the repreſentation. This is ridiculed by the Spectator, and compared to a merry jigg upon the organ, after a good ſermon, to wipe away any impreſſions that might have been made thereby, and ſend the people away juſt as they came. This practice, however, has the countenance of antiquity, for the Romans had ſomething of the ſame nature, though under a different name; but their exodium was a kind of farce or pantomine, brought on the ſtage when the tragedy was over, to compoſe the minds of the audience.

EPIMEDIUM, BARREN-WORT, in botany, a genus of the tetrandria-monygynia claſs of plants, the flower of which conſiſts of four ovated, obtuſe, concave, patent petals: the fruit is an oblong acuminated pod, compoſed of one cell, but divided by two valves, containing ſeveral oblong ſeeds.

If we may believe Dioſcorides, the leaves of this plant, triturated and drank to the quantity of five drams in wine, for five days together, after the menſtrual purgation, effectually prevent conception.

EPINICION, in the greek and latin poetry, denotes a poem or compoſition on occaſion of a victory obtained. It alſo ſignifies a rejoicing, or feſtival, on account of a victory.

EPIPHANY, a chriſtian feſtival, otherwiſe called the Manifeſtation of Chriſt to the Gentiles, obſerved on the ſixth of January, in honour of the appearance of our Saviour to the three magi, or wiſe men, who came to adore him, and bring him preſents. The feaſt of epiphany was not originally a diſtinct feſtival, but made a part of that of the nativity of Chriſt, which being celebrated twelve days, the firſt and laſt of which were high or chief days of ſolemnity, either of theſe might properly be called epiphany, as that word ſignifies the appearance of Chriſt in the world.

The kings of England and Spain offer gold, frankincenſe, and myrrh, on epiphany, or twelfth day, in memory of the offerings of the wiſe men to the infant Jeſus.

The feſtival of epiphany is called by the Greeks the feaſt of lights, becauſe our Saviour is ſaid to have been baptized on this day; and baptiſm is by them called illumination.

EPIPHONEMA, in rhetoric, a ſententious exclamation containing a lively remark placed at the end of a diſcourſe or narration; ſuch as that of Virgil,

Fas omne abrumpit, Polydorum obtruncat, & auro
Vi potitur. Quid non mortalia pectora cogis
Auri ſacra fames?

And that of Lucretius, lib. i.

Tantum relligio potuit ſuadere malorum!

So Milton on the obſtinacy of the rebel angels, who were ſo infatuated, that they would not ſubmit, though they knew almighty power and majeſty came armed againſt them:

"In heav'nly minds can ſuch perverſeneſs dwell?"

This figure cloſes a narration in a very advantageous manner, deeply impreſſes the thing related upon the memory of the reader, and leaves him well pleaſed with the ſenſe and ſagacity of his author. See the article SENTENCE.

EPIPHORA, in medicine, a preternatural defluxion of the eyes, when they continually diſcharge a ſharp ſerous humour, which excoriates the cheeks. The cure is performed by a derivation of the offending humour elſewhere, by bleeding, cupping, bliſters, purges, *&c.* The acrimony is likewiſe to be corrected by bitter chalybeate wine: ſometimes wine drank alone will perform the cure; after which, aſtringent topics are to be made uſe of.

If an epiphora has been of long ſtanding, it

it is difficult to be cured, and often degenerates into a fiftula lachrymalis. See the article FISTULA LACHRYMALIS. Pitcairn calls an epiphora a fort of catarrh in the glands of the eye. See the article CATARRH.

EPIPHYLLOSPERMOUS PLANTS, the fame with the capillary ones. See the article CAPILLARY.

EPIPHYSIS, in anatomy, a bony fubftance, or as it were a leffer bone, affixed to a larger or principal bone, by the intervention of a cartilage. In young fubjects thefe epiphyfes are not continuous to the principal bone, but are only connected by the intermediate cartilage, and hence they are called appendages to the bones. It is to be obferved of epiphyfes, 1. That they are all cartilaginous in infants; and though they afterwards grow hard, yet they never arrive at the true denfity of a bone. 2. That moft of them degenerate into apophyfes in adults. 3. That they do not grow along the plain furface of the bone, but unequally, or by a mutual ingrefs with the body of it.

The ufe of the epiphyfes is very different in adults and in infants: in adults they feem in the firft place to ferve the bones which contain large quantities of marrow, by way of operculum, that this foft matter may not run out. 2. They are of fervice to the articulations, rendering the motions more eafy, as well as more determinate. 3. They make the whole bone lighter than it would be, if their place were fupplied by abfolute bony matter. 4. They increafe the power of the mufcles about the tendons, by means of their prominences. 5. They add to the fize of the places deftined for receiving the infertions of the mufcles. 6. They give a firmer cohefion to the ligaments which ferve in the articulations, and allow an entrance to the blood-veffels. The ufes of the epiphyfes in infants are, 1. That by means of their yielding foftnefs, they may give way to the compreffion in the uterus, and fuffer the whole bulk to be more folded together than otherwife it could, fo that it may lie in a fmaller compafs. 2. That they may give way to the elongation and growth of the bones. 3. That they may prevent the frequent fractures, which would otherwife unqueftionably happen to children from their falls, and the other accidents they are liable to.

EPIPLASMA, the fame with cataplafm. See the article CATAPLASM.

EPIPLOCELE, in medicine, is a kind of hernia, or rupture, in which the omentum fubfides into the fcrotum. The cure confifts principally in a reduction of the tumour, by returning the omentum again into the abdomen, and in fecuring the parts from a relapfe by a trufs or bandage. See HERNIA and ENTEROCELE.

EPIPLOIS, in anatomy, a term applied to the arteries and veins diftributed thro' the fubftance of the epiploon or caul: thus, the dextra epiplois is a branch of the right fide of the cœliac artery, and the finiftra epiplois and gaftro-epiplois are terms by which anatomifts call branches from the left fide of the coeliac artery. See the articles COELIAC and ARTERY.

EPIPLOOMPHALON, ἐπιπλοομφαλον, in medicine, an hernia umbilicalis, proceeding from the omentum falling into the region of the umbilicus or navel. See the article EXOMPHALUS.

EPIPLOON, the fame with what is otherwife called omentum. See OMENTUM.

EPIPLOSARCOMPHALUS, in furgery, a kind of exomphalus. See the article EXOMPHALUS.

EPISCOPACY, the quality of epifcopal government, or that form of church difcipline, wherein diocefan bifhops are eftablifhed diftinct from and fuperior to priefts or prefbyters. See the article BISHOP.

EPISCOPALIANS, in church-hiftory, an appellation given to thofe who prefer the epifcopal government and difcipline to all others.

By the teft act, none but epifcopalians, or members of the church of England, are qualified to enjoy any office civil or military. See the article TEST ACT.

EPISODE, ἐπεισόδιον, in poetry, a feparate incident, ftory, or action, which a poet invents, and connects with his principal action, that his work may abound with a greater diverfity of events: though, in a more limited fenfe, all the particular incidents whereof the action or narration is compounded, are called epifodes. See the articles EPIC and TRAGEDY.

The epifode, in its original, was only fomething rehearfed between the parts of the chorus, or antient tragedy, for the diverfion of the audience. Epifodes ferve to promote the action, to illuftrate, embellifh, and adorn it, and carry it to its proper period. Epifodes are either abfolutely neceffary, or very requifite. All epifodes

episodes are incidents, tho' all incidents are not episodes; because some incidents are not adventitious to the action, but make up the very form and series of it. Examples will clear up this distinction: the storm in the first Æneid of Virgil, driving the fleet on the coast of Carthage, is an incident, not an episode, because the hero himself and the whole body of his forces are concerned in it; and so it is a direct and not a collateral part of the main action. The adventures of Nisus and Euryalus, in the ninth Æneid, are episodes, not incidents, *i. e.* not direct parts of the main action.

It is particularly by the art of episodes that the great variety of matter which adorns a poem is brought into the principal action: but though the episodes are a kind of digression from the subject, yet they ought to have a natural relation to the principal action, never be far-fetched, and must be handled with judgment, to avoid confusion and burdening the subject with too much action. Without this restriction the episode is no longer probable, and there appears an air of affectation which becomes ridiculous. Aristotle calls all those fables episodic, which abound in episodes not necessarily nor properly connected with each other.

The most natural episodes are the properest to circumstantiate the principal actions, namely, the causes, the effects, the beginnings, and the consequences of it. Homer and Virgil have shewn their principal art in this particular: the action of the Iliad and that of the Æneid were in themselves exceeding short, but are so beautifully lengthened and diversified by the intervention of episodes, that they make up an agreeable story, sufficient to employ the memory without overcharging it. See the article EPIC.

Our noble poet Milton has excelled in this art; he has no other episodes than what naturally arise from the subject, and yet his poem of Paradise Lost is filled with a multitude of astonishing incidents. Those great actions, the battle of the angels, and the creation of the world, are by way of episode to this noble poem. With the like art, and in the same manner, in that part of it which regards the fall of man, he has related the fall of these angels who are his professed enemies; besides the many other beauties of such an episode, its running parallel with the great action of the poem, hinders it from breaking unity so much as another episode would have done, that had not so great an affinity with the principal subject.

EPISODIC, an epithet given epic poems swelled too much with episodes. See the preceding article.

EPISPASTIC, in medicine, a topical remedy, which being applied to the external parts of the body, attracts the humours to that part. See VESICATORY.

EPISTATES, in the athenian government, was the president of the proedri. The constitution was this: the ten tribes of Athens elected every year by lot each of them fifty senators, which made a senate of five hundred; every tribe had the precedence in its turn, and surrendered it again successively to another, the fifty senators in office were called prytanes. During the term or duration of their office, which was thirty-five days, ten of the fifty prytanes presided weekly under the name of proedri; and of these proedri there was one to preside each day of the week, under the title of epistates.

To the custody of this officer was committed the public seal, and the keys of the citadel and the public exchequer: this therefore was an office of so great trust and power, that no man was permitted by the laws to continue in it above one day, nor to be elected into it a second time. The epistates were elected by lot out of the prytanes.

Epistates was also the president of the assembly, chosen by lot out of the proedri, the chief part of whose office seems to have consisted in granting the people liberty to give their voices, which they were not permitted to do till he had given the signal. If the people were remiss in coming to the assemblies, the magistrates used their utmost endeavours to compel them, for they shut up all the gates, that only excepted through which they were to pass to the assembly, and took care that all vendibles should be taken out of the market, that there might be nothing to divert them from appearing.

EPISTEMONARCH, in the antient greek church, an officer of great dignity, who had the care of every thing relating to faith, in the quality of censor. His office answered pretty nearly to that of master of the sacred palace at Rome.

EPISTLE, επιστολη, denotes the same with a missive letter; but is now chiefly used in speaking of antient writings, as the epistles of St. Paul, epistles of Cicero, epistles of Pliny, &c.

The epistles of St. Paul, which are fourteen

teen in number, make part of the canon of the New Teſtament; beſides which there is one general epiſtle of St. James, two of St. Peter, three of St. John, and one of St. Jude.

Dedicatory EPISTLE, in matters of literature. See DEDICATION.

EPISTOLARY, ſomething belonging to an epiſtle. See the article EPISTLE.

The art of epiſtolary writing is acknowledged to be very entertaining and inſtructive. The Romans ranked it in the number of liberal and polite accompliſhments. And, indeed, it enters ſo much into all the occaſions of life, that no gentleman can avoid ſhewing himſelf in this kind of compoſition; the chief excellence of which conſiſts in expreſſing ordinary occurrences, in an elegant and uncommon manner. However, it is proper to obſerve, that ſuch is the nature of epiſtolary writings, in general, as unavoidably renders them obſcure, ſince the writer paſſes by many things, as being well known to him to whom the letter is addreſſed, which muſt be laid open to a ſtranger, before he can fully comprehend what is ſaid. Hence it is, that the epiſtles of the antients, whether ſacred or prophane, are ſo difficult to be underſtood.

EPISTROPHE, in rhetoric, a figure, wherein that which is ſuppoſed of one thing, is ſtrongly affirmed of another: thus, *Are they Hebrews? ſo am I. Are they Iſraelites? ſo am I. Are they of the ſeed of Abraham? ſo am I, &c.*

EPISTYLE, in the antient architecture, a term uſed by the Greeks for what we call architrave, *viz.* a maſſive piece of ſtone, or wood, laid immediately over the capital of a column. See ARCHITRAVE and COLUMN.

EPITAPH, a monumental inſcription in honour or memory of a perſon defunct, or an inſcription engraven or cut on a tomb, to mark the time of a perſon's deceaſe, his name, family; and, uſually, ſome eulogium of his virtues, or good qualities.

The elegance of an epitaph, as well as an elegy, chiefly conſiſts in an expreſſive brevity. The French have a proverb, *He lies like an epitaph*, by reaſon they ſometimes give characters abſolutely falſe. At Lacedæmon epitaphs were only allowed to thoſe who died in battle. The reſt of the Greeks allowed of epitaphs, the form of which was generally as follows:

ΝΙΚΩΝ ΖΗΝΩΝΟΣ
ΧΡΗΣΤΕ ΧΑΙΡΕ.

Nicon, ſon of Zenon,
Good man, happineſs to you.

ΟΛΥΜΠΙΑΣ
ΧΡΗΣΤΗ
ΧΑΙΡΕ.

Olympia,
Good woman,
Happineſs to you.

The Romans, in their epitaphs, introduced their dead ſpeaking, as in the following, wherein the dead wife thus beſpeaks her ſurviving huſband:

Immatura peri: ſed tu, felicior, annos
Vive tuos, conjux optime, vive meos.

Sometimes the roman epitaphs were full of moral expreſſions, and adorned with fine carved work, &c. At the top they always had the words DIIS MANIBUS. It has been much diſputed by learned men whether or no epitaphs were in uſe among the antient Hebrews: however this be, it is certain the Jews have, of a very antient date, received this cuſtom, of which Buxtorf produces ſeveral inſtances.

EPITASIS, in antient poetry, the ſecond part or diviſion of a dramatic poem, wherein the plot, entered upon in the firſt part, or protaſis, was carried on, heightened, and worked up, till arrived at its ſtate, or height, called cataſtaſis. See the articles PROTASIS, CATASTASIS, DRAMA, &c.

In the epitaſis, accidents, as they are called by the moderns, ariſe; all things are in confuſion, and involved in doubts and difficulties. Voſſius ſays, the epitaſis is contained in the ſecond; ſometimes in the third and fourth, but very rarely any part of it in the fifth act: but Dr. Trap ſays, that there is no act to which the epitaſis is not ſuitable; nay, that ſome of it ought always to be in the fifth act.

It is the epitaſis that ſupports the weight and burden of the poem; upon it the criſis of the action chiefly turns. This diviſion of tragedy is laid aſide in the modern drama, inſtead whereof plays are divided into acts. See the article ACT.

EPITASIS, in medicine, the increaſe of a diſeaſe, or beginning of a paroxyſm, particularly in a fever. See FEVER.

EPITHALAMIUM, in poetry, a nuptial ſong, or compoſition, in praiſe of the bride

bride and bridegroom, praying for their proſperity, for a happy offspring, &c. Among the Greeks, the married couple were no ſooner bedded, than the young men and maids gathered round the door, dancing and ſinging the epithalamium, ſhouting and ſtamping with their feet, with intention to drown the maid's cries. When they returned again in the morning, to ſalute the married couple, they ſung the επιθαλαμια εγερτικα, ſo named from the deſign of them, which was to wake and ariſe the bridegroom and bride; as thoſe ſung the night before were deſigned to diſpoſe them to ſleep, and on that account, were termed επιθαλαμια κοιμητικα.

EPITHEM, in pharmacy, a kind of fomentation, or remedy of a ſpirituous or aromatic kind, applied externally to the regions of the heart, liver, &c. to ſtrengthen and comfort the ſame, or to correct ſome intemperature thereof. See the article FOMENTATION.

There are principally three kinds of theſe external applications, the liquid, the ſolid, and the ſoft or poultice-kind. The liquid epithems are ſometimes conſiderably thick; but when they are intended to penetrate deep, they are much better if very thin and fluid. As to the part to which the epithem is immediately applied, it is not what it is always intended to act upon, as this frequently lies deep within: the epithems, therefore, intended for this purpoſe, ſhould conſiſt of the moſt penetrating ingredients, for which reaſon aſtringents and inſpiſſating remedies can be of no uſe; but in this form hot wine alone is ſometimes uſed as an epithem, and often ſuch medicines as are not to be ſafely taken inwardly, ſuch as highly rectified ſpirits, preparations of lead, henbane, mandrake, and other poiſonous plants, and the like: but we are carefully to remember in regard to theſe, that the pores are capable of abſorbing them, and ought therefore to know the effects they are capable of producing, when thus abſorbed in the body. As to the vehicles of the liquid epithems, they are various, as linen or woollen-cloth, ſilk, ſtupes, toaſted bread, &c. They are in ſome caſes to be applied hot, in others, cold: when the intention is to reſolve, penetrate, and attract, then the hot are to be preferred; but theſe are injurious to parts conſtricted by intenſe cold.

The dry epithems are medicated powders, uſually ſewed up in a cloth, and applied to different parts of the body; for which purpoſe the powders muſt be coarſe. Sometimes the liquid epithems are added to the dry, to reduce the whole to a conſiſtence, ſuch as may be ſpread upon cloth, and applied.

Volatile EPITHEM, is a form of medicine preſcribed in the London Diſpenſatory, ordered to be made up of equal weights of common turpentine and ſpirit of ſal armoniac, by ſtirring them together in a mortar.

EPITHET, in poetry and rhetoric, an adjective expreſſing ſome quality of a ſubſtantive to which it is joined; or ſuch an adjective as is annexed to ſubſtantives by way of ornament and illuſtration, not to make up an eſſential part of the deſcription. Nothing, ſays Ariſtotle, tires the reader more than too great a redundancy of epithets, or epithets placed improperly; and yet nothing is ſo eſſential in poetry as a proper uſe of them. The writings of the beſt poets are full of them, eſpecially Virgil.

We may diſtinguiſh two kinds of epithets, *viz.* 1. Thoſe which add a new idea quite diſtinct from the general nature of a ſubſtantive. Thus Virgil in his Georgics,

Inter cunctantes *cecedit moribunda miniſtros.*

And, 2. Thoſe that bring with them ſome light and ornament, but not new ideas. Thus the ſame poet,

Timidi *damæ*, *cervique* fugaces.

The firſt kind of epithets entertain the mind with a more agreeable variety, but thoſe of the ſecond require, perhaps, more care and judgment in the proper choice of them. For inſtance, becauſe Virgil has ſaid, *the fearful deer and fleeting ſtags*, it by no means follows that theſe epithets are applicable whenever ſtags and deer ſhall happen to be mentioned. They are proper in the place where he uſes them, but may not be ſo always.

EPITOME, in literary hiſtory, an abridgment or ſummary of any book, particularly of a hiſtory. See ABRIDGMENT. It is pretended that the epitomizing of authors, frequently occaſions the loſs of the originals. Thus the loſs of Pompeius Trogus, is inſcribed to his epitomiſer Juſtin; and the loſs of a great part of Livy, to Lucius Annæus Florus.

EPITRITUS, in proſody, a foot conſiſting of three long ſyllables and one ſhort. Of theſe, grammarians reckon four kinds; the firſt conſiſting of an iambus and ſpondee, as ſălūtāntēs: the ſecond, of a trocheus and ſpondee, as cōncĭtātī: the third,

third, of a spondee and an iambus, as commūnĭcāns: and the fourth, of a spondee and trocheus, as īncāntārĕ. See the articles SPONDEUS, TROCHEUS, &c.

EPITROCHASMUS, Ἐπιτροχασμός, in rhetoric, a figure wherein we slightly pass over several things of great moment, by only mentioning them in general. Such is the saying of Cæsar, *veni, vidi, vici.* And the following passage of Virgil, Æn. 4.

——Faces in castra tulissem,
Implessemque foros flammis, natumque patremque
Cum genere exstinxem, memet super ipsa dedissem.

EPITROPE, in rhetoric, a greek term for the same figure which the Latins call concessio. See the article CONCESSION.

EPITROPUS, among the modern Greeks, a kind of arbitrator chosen by the greek christians under the dominion of the Turks, to terminate their differences, and avoid carrying them before the turkish magistrates. See ARBITRATOR.

EPIZEUXIS, in rhetoric, a figure which repeats the same word, without any other intervening: such is that of Virgil, *nunc, nunc, insurgite remis.*

EPLOYÉ, in heraldry, the same with displayed. See the article DISPLAYED.

EPOCHA, in chronology, a term or fixed point of time, whence the succeeding years are numbered or accounted. See the article ÆRA.

The most remarkable epochas are those that follow.

EPOCHA *of the creation of the world.* According to the vulgate, archbishop Usher places this event 4004 years before the birth of Christ; Scaliger makes it 3950; Petavius, 3984; and Ricciolus, 4184 years before Christ. According to the septuagint, Eusebius places the creation 5200 years before the nativity of our Lord; the alphonsine tables, 6934; and Ricciolus, 5634. The creation, therefore, as we follow the archbishop, happened in the year 710 of the julian period. See the article JULIAN PERIOD.

Sir Isaac Newton, again, makes the creation of the world later by 500 years than all other chronologists; and the proofs by which this illustrious philosopher supports his opinion, are of two different kinds. The Egyptians counted 341 generations from Menes to Setho, allowing an hundred years for three generations; and the antient Greeks computed one generation at about forty years. Now, says Sir Isaac, it is true, three ordinary generations may be computed at about 120 years; but generations are longer than the reigns of kings, because it is evident that mankind in general live longer than kings. The duration of a reign, therefore, taking one with another, is, according to him, about twenty years; whence he concludes, that the antients have erred in their calculation in allowing forty years for every generation. The second kind of proof is taken from the precession of the equinoxes. See the article PRECESSION, &c.

According to Clemens Alexandrinus, Chiron, who was in the expedition of the argonauts, fixed the vernal equinox at the fifteenth degree of aries, and consequently the summer solstice at the fifteenth degree of cancer. Meto fixed the summer solstice at the eighth degree of cancer, a year before the peloponesian war. Now since one degree answers to the retrograde motion of the equinoctial points in 72 years, there are seven times 72 years from the expedition of the argonauts to the beginning of the peloponesian war; that is 504 years, and not 507 years, as the Greeks affirm. By combining these two different proofs, Sir Isaac concludes, that the expedition of the argonauts ought to be placed 909 years before Jesus Christ, and not 1400, as is generally believed; and therefore that the creation of the world ought to be placed about 500 years later than chronologists generally place it.

EPOCHA *of the deluge.* According to the hebrew text, there are 1656 years from the creation to the deluge; 1307, according to the Samaritan; 2242, according to Eusebius and the septuagint; 2256, according to Josephus and the Septuagint, and 2262, according to Julius Africanus, Petavius, and the Septuagint. In following the hebrew text, this epocha begins in the year 2366 of the julian period.

EPOCHA *of the olympiads,* used principally by the Greeks, had its origin from the olympic games, which were celebrated at the beginning of every fifth year. This epocha begins 776 years before the incarnation, or in the 3938 of the julian period.

Varronian EPOCHA *of the building of Rome,* is fixed 753 years before our Saviour's birth, and in the 3961 of the julian period.

EPOCHA *of Nabonassar king of Babylon,* made

made use of by Ptolemy, Censorinus, and several other authors, began 747 years before the incarnation, and in the 3967 of the julian period.

Julian EPOCHA. The first year of Julius Cæsar's correcting the calendar stands 45 years before our Saviour's birth, and coincides with the 4669 of the julian period.

EPOCHA *of Christ*. The christian world generally reckoned from the epocha of the creation, the building of Rome, the consuls register, or the emperor's reign, till about 500 years after Christ, when the epocha of the nativity of our blessed Lord was introduced by Dionysius Exiguus. He began his account from the conception or incarnation properly called Lady-day. Most countries in Europe, however, at present reckon from the first of January next following, except the court of Rome, where the epocha of the incarnation still obtains for the date of their bulls and briefs. But here we are to observe, that there are different opinions touching the year of our Saviour's birth. Capellus and Kepler fix it at about the 748th year from the building of Rome. Deckar and Petavius place the incarnation in the 749th of Rome. Scaliger and Vossius make it fall on the 751st of Rome. Dionysius Exiguus, Bede, &c. fix the birth of our Saviour to the year 751 of Rome; the diversity of these opinions proceeding from the difficulty of fixing Herod the great's death, who, as is evident from the evangelists, was living at our Saviour's birth, the taxation of Cyrenius, and the time of our Saviour's beginning his ministry. But let this be as it will, it is generally agreed, that as to computation and use, the common epocha is to be followed, which places the birth of Christ in the 4713th of the julian period, although the true birth rather corresponds with the 4711th of the same period.

Dioclesian EPOCHA, or EPOCHA *of martyrs*, called also the æra of the copthi or Egyptians, because the emperor Dioclesian made a great many martyrs in Egypt, begins in the year 283 of our lord, and the 4997 of the julian period.

EPOCHA *of the hegira*, or flight of Mahomet, used among the Turks, is the year of the julian period 5335, answering to the year of Christ 622.

Yezdejerdic, or *Persian* EPOCHA, is the year of the julian period 5345, answering to the year 622.

To reduce the years of one epocha to those of another, observe the following rule: add the given year of an epocha to the year of the julian period corresponding with its rise, and that will give the year of the period.

For example, if to 1754, the present year of the christian epocha, we add 4713, the year of the julian period corresponding with its rise, the sum, 6467, will be the present year of the julian period: now if we subtract from the year thus found, the year of the julian period corresponding with the rise of any epocha, the remainder shews the true method of making a just connexion betwixt that epocha and the known year of Christ.

Again, if we want to find the year of the julian period corresponding to a given year before Christ, we subtract the given year from 4713, and the remainder is the year required.

Spanish EPOCHA. See the article ÆRA.

EPODE, in lyric poetry, the third or last part of the ode, the antient ode being divided into strophe, antistrophe, and epode. See the articles ODE, &c.

The epode was sung by the priests, standing still before the altar, after all the turns and returns of the strophe and antistrophe, and was not confined to any precise number or kind of verses.

The epode is now a general name for all kinds of little verses that follow one or more great ones, of what kind soever they be; and in this sense, a pentameter is an epode after an hexameter. And as every little verse, which being put after another, closes the period, is called epode; hence the sixth book of Horace's odes is entitled *Liber Epodon*, Book of Epodes, because the verses are all alternately long and short, and the short ones generally, though not always, close the sense of the long one.

EPOMIS, in anatomy, a muscle, otherwise called deltoides. See DELTOIDES.

EPOPOEIA, in poetry, the story, fable, or subject treated of, in an epic poem. See the article FABLE.

The word is commonly used for the epic poem itself. See the article EPIC.

EPOTIDES, in the naval architecture of the antients, two thick blocks of wood, one on each side the prow of a galley, for warding off the blows of the rostra of the enemy's vessels. See the articles GALLEY and ROSTRUM.

EPPINGEN, a town of Germany, situated about ten miles north of Hailbron.

EPSOM, a town of Surry, about fifteen miles

miles south-west of London; much resorted to on account of its medicinal waters; from which the bitter purging salt being first extracted, got the name of epsom-salt. At present, however, the bitter purging salt is procured from the bittern, remaining after the crystallization of common salt; and this is found to answer all the purposes of that first obtained from Epsom-waters, and goes by its name.

Epsom-salt is esteemed good in colics, the scurvy, diabetes, loss of appetite, the rheumatism, jaundice, hypochondriac affection, and other chronic complaints. The best way of taking it is with any chalybeate waters, as those of Tunbridge; for instance, a dram, or a dram and an half, dissolved in the three or four first draughts.

EPULIDES, or PARULIDES, in surgery. See the article PARULIDES.

EPULONES, in roman antiquity, ministers who assisted at the sacrifices, and had the care of the sacred banquet committed to them. At first they were only three in number, but afterwards increased to seven. Their office was, to give notice when feasts were to be held in honour of the gods; and, to take care that nothing was wanting towards the celebration. See the article EPULUM.

EPULOTICS, ἐπυλωτικα, the same with cicatrizants. See CICATRIZANTS.

EPULUM, *banquet*, in antiquity, a holy feast prepared for the gods. The statues of the gods were commonly laid upon a bed, and served in the epula, as if they had been very hungry; to perform which was the function of the ministers of sacrifice, hence called *epulones*.

EQUABLE, an appellation given to such motions as always continue the same in degree of velocity, without being either accelerated or retarded.

When two or more bodies are uniformly accelerated or retarded, with the same increase or diminution of velocity in each, they are said to be equably accelerated or retarded.

EQUAL, a term of relation between two or more things of the same magnitude, quantity, or quality.

Mathematicians speak of equal lines, angles, figures, circles, ratios, solids, &c. See the articles LINE, ANGLE, &c.

EQUALITY, that agreement between two or more things, whereby they are denominated equal.

The equality of two quantities, in algebra, is denoted by two parallel lines placed between them: thus, $4+2=6$, that is, 4 added to 2, is equal to 6.

EQUANIMITY, in ethics, denotes that even and calm frame of mind and temper, under good or bad fortune; whereby a man appears to be neither puffed up, or overjoyed with prosperity; nor dispirited, soured, or rendered uneasy by adversity.

EQUANT, in the old astronomy, a circle described on the center of the deferent, for accounting for the excentricity of the planets. See EXCENTRICITY.

EQUATION, in algebra, the mutual comparing two equal things of different denominations, or the expression denoting this equality; which is done by setting the one in opposition to the other, with the sign of equality ($=$) between them: thus $3\,s=36\,d$, or 3 feet$=$1 yard. Hence, if we put a for a foot, and b for a yard, we will have the equation $3\,a=b$, in algebraical characters.

When a problem is proposed to be resolved by means of equations, the first thing to be done is to form a clear conception of the conditions and nature of it; taking care to substitute the first letters of the alphabet for known quantities, and the last letters of the alphabet for unknown ones. Then by due reasoning from the conditions of the question, let the quantities concerned therein be justly stated, and carefully compared; so that their relation to one another may appear, and the difference, which renders them unequal, be discovered; and, consequently, the same thing found expressible two ways, or brought into an equation, or several equations independent on each other. And here it is to be observed, 1. That if there are as many equations given, as there are quantities sought, then the question has a determinate number of solutions, or is truly limited, *viz.* each quantity sought hath but one single value. Thus, suppose a question proposed concerning the age of three persons, was conditioned as follows, *viz.* the second is seven years older than the first, the age of the third is triple that of the first and second, and the sum of all their ages is 68. Required the age of each. In order to bring this question to an equation, put z for the age of the first; then will the age of the second be $z+7$, and the age of the third $6\,z+21$: the sum of all their ages $z+z+7+6\,z+21=68$. So that here is but one

 equation

equation given, and one quantity required, *viz.* the age of the first. 2. When the number of the quantities fought exceed the number of the given equations, the question is capable of an indeterminate number of anfwers; and, therefore, can be but imperfectly determined.

Reduction of EQUATIONS. If the question, when ftated, is found to have a determinable number of folutions, then the equation, directly drawn from the conditions of the queftion, muft be reduced into another, by equal augmentation and diminution; fo that the known quantities may ftand on one fide, and one of the unknown quantities, or fome power of it, on the other fide of the equation. This is called reduction of equations, and depends upon a right application of the five following axioms: 1. If equal quantities be added to equal quantities, the fum of thofe quantities will be equal. 2. If equal quantities be fubtracted or taken from equal quantities, the quantities remaining will be equal. 3. If equal quantities be multiplied by equal quantities, their products will be equal. 4. If equal quantities be divided by equal quantities, their quotients will be equal. 5. Quantities that are equal to one and the fame thing, are alfo equal to one another.

If thefe axioms be well underftood, the reduction of equations will appear very plain, and the operations be eafily performed. 1. Reduction by tranfpofition, is performed by transferring a quantity to the other fide of the equation with a contrary fign; or by equal addition, if the quantity be negative; and by equal fubtraction, if affirmative. Thus the equation $x - 10 = 40$, is reduced by adding $+ 10$ to each fide, and the refult will be the fame as if $- 10$ had been tranfpofed to the oppofite fide with the contrary fign; for $x - 10 + 10 = 40 + 10$, is the fame with $x = 40 + 10$, the $- 10$ and $+ 10$ deftroying each other. In the fame manner $x + 10 = 40$, is reduced to $x = 40 - 10$, by tranfpofing the $+ 10$ with a contrary fign. 2. Reduction is performed by equal multiplication, in cafe there are fractional quantities; for by multiplying every term in the equation by the denominators of the fractions, it will be cleared of fractions: thus by multiplying every term of the equation $\frac{z}{a} = b$ by the denominator a, we will have $z = ab$. Again, if $\frac{z^3 + 3a^2}{c} + n + a = z + a$; then by multiplying by the denominator c, we will have an equal equation free from fractions, *viz.* $z^3 + 3a^2 + cn + ac = cz + ac$, or $z^3 + 3a^2 + cn = cz$, the ac on each fide being rejected. 3. By equal divifion, as in the equation $ax = c$; for by dividing each fide by a, we will have $x \left(\text{or } \frac{ax}{a}\right) = \frac{c}{a}$. In the fame manner, in the equation $az + ez = cb$, by dividing each fide by $a + e$, we get the equation $z = \frac{cb}{a+e}$. 4. Equations are cleared of furd quantities by involution: thus, if the equation be $\sqrt{a} = 6$; then by involution or fquaring each fide of the equation, we have the equation $a = 36$. If both fides be fimilar furds, or of the fame power, all that we have to do is to reject the radical fign: thus, for $\sqrt{a} = \sqrt{d+c}$, we write $a = d + c$, rejecting the radical fign of both. 5. When any fingle power of the unknown quantity is on one fide of the equation, evolve or extract the root of both fides, according as the index of that power denotes, and their roots will be equal. Thus if $zz = 25$, by extracting the root of each fide we have $z = 5$. In the fame manner, if $aaa = 27$, their cube roots will be equal, *viz.* $a = 3$. Or, if any compound power of the unknown quantity be on one fide of an equation, that hath a true root of its kind; then, by evolving both fides of the equation, it will be expreffed in lower terms: for example, $a^2 + 2ba + b^2 = d^2$, by evolving both fides, comes out $a + b = d$. 6. A proportion may be converted into an equation, afferting the product of the extremes to be equal to that of the means; or, any one of the extremes may be made equal to the product of the means divided by the other extreme: thus, if $12 - x : \frac{x}{2} :: 4 : 1$, then $12 - x = 2x$; and by tranfpofing the $-x$, we will have $3x = 12$, and dividing by 3, $x = \frac{12}{3} = 4$, by the preceding rules. 7. If any quantities be found on both fides of the equation, with the fame fign prefixed, they may be taken away from both: thus, for $3x + b = a + b$, we fay $3x = a$. Alfo, if all the quantities of the

the equation be multiplied or divided by the ſame quantity, it may be ſtruck out of them all: thus, if $3ax+5ab=8ac$, dividing by a, we have $3x+5b=8c$; and tranſpoſing $5b$ and dividing by 3, we have $x=\frac{8c-5b}{3}$, according to the firſt and third rules. 8. Inſtead of any quantity in an equation, you may ſubſtitute another equal to it: thus, if $3x+y=24$, and $y=9$; then $3x+9=24$, or $x=\frac{24-9}{3}=5$.

Solution of ſimple EQUATIONS. 1. After an equation is formed, if you have only one unknown quantity, then, by the preceding rules, bring it to ſtand alone on one ſide, ſo as to have none but known quantities on the other ſide; by which means you will diſcover its value. Thus, if the queſtion propoſed be that of the three perſons ages already mentioned, the equation thence reſulting has been found to be as in

Example I.

By queſt.	1	$z+z+7+6z+21=68$
1 tranſp.	2	$8z=68-28=40$
$2\div 8$	3	$z=\frac{40}{8}=5=$ firſt age.
Hence	4	$z+7=12=$ ſecond age.
And	5	$12+5\times 3=51=$ third age.

Example II.

$$\frac{3x}{4}\times\frac{x}{12}=x$$

$$\frac{3x^2}{48}=x$$

and $3x^2=48x$ by the ſecond rule.
and $3x=48$ by the ſeventh rule.
and $x=\frac{48}{3}=16$ by the third rule.

2. If there are two unknown quantities, then there muſt be two equations ariſing from the conditions of the queſtion; ſuppoſe x and y. The rule is, to find a value of x or y from each of the equations, and then by putting theſe two values equal to each other, there will ariſe a new equation involving only one unknown quantity, which muſt be reduced by the ſame rules as formerly.

Example: let the ſums of two quantities be s, and their difference d; let s and d be given, and let it be required to find the quantities themſelves. Suppoſe the quantities to be x and y; then, by the queſtion, $x+y=s$, and $x-y=d$; whence $x=s-y=d+y$; and, by tranſpoſition, $2y=s-d$; ſo that dividing by 2, we have $y=\frac{s-d}{2}$; and by comparing the value of x, viz. $s-y$, we find $x=s-\frac{s+d}{2}$, or $2x=2s-s+d$, and dividing by 2, the value of $x=\frac{s+d}{2}$, as expreſſed in the margin.

$$x+y=s$$
$$x-y=d$$
$$x=s-y$$
$$x=d+y$$
$$s-y=d+y$$
$$2y=s-d$$
$$y=\frac{s-d}{2}$$
$$x=\frac{s+d}{2}$$

3. When in one of the given equations, the unknown quantity is of one dimenſion, and in the other of a higher dimenſion; you muſt find a value of the unknown quantity from that equation where it is of one dimenſion, and then raiſe that value to the power of the unknown quantity in the other equation; and by comparing it, ſo involved, with the value you deduce from that other equation, you will obtain an equation that will have only one unknown quantity and its powers: that is, when you have two equations of different dimenſions, if you cannot reduce the higher to the ſame dimenſion with the lower, you muſt raiſe the lower to the ſame dimenſion with the higher. Example: the ſum of two quantities, and the difference of their ſquares, being given, to find the quantities themſelves. Suppoſe them to be x and y, their ſum s, and the difference of their ſquares d. Then,

$$x+y=s$$
$$x^2-y^2=d$$
$$x=s-y$$
$$x^2=s^2-2sy+y^2$$
$$x^2=d+y^2,\text{ whence}$$
$$d+y^2=s^2-2sy+y^2$$
$$d=s^2-2sy$$
$$2sy=s^2-d$$
$$y=\frac{s^2-d}{2s}$$
$$\text{and } x=\frac{s^2+d}{2s}.$$

4. If there are three unknown quantities, there muſt be three equations in order to determine them, by comparing which you may, in all caſes, find an equation involving only one unknown quantity; which may be reſolved by the rules for reduction of equations already mentioned.

From

From three equations involving any three unknown quantities, x, y, and z, to deduce two equations involving only two unknown quantities, the following rule will always ferve; find three values of x from the three given equations; then, by comparing the firft and fecond value, you will find another equation involving only y and z: again, by comparing the firft and third, you will find another equation involving only y and z; and, laftly, thofe equations are to be folved by the fecond direction.

Example: fuppofe

$$\left.\begin{array}{l} x+y+z=12 \\ x+2y+3z=20 \\ \frac{x}{3}+\frac{y}{2}+z=6 \end{array}\right\} \text{then } x=\left\{\begin{array}{l} 12-y-z \\ 20-2y-3z \\ 18-\frac{3y}{2}-3z \end{array}\right\}\left\{\begin{array}{l} \text{firft} \\ \text{fecond} \\ \text{third} \end{array}\right\}\text{value.}$$

$$12-y-z=20-2y-3z$$
$$12-y-z=18-\frac{3y}{2}-3z$$

Thefe two laft equations involve only y and z, and are to be refolved by the fecond direction. Thus,

$$\left\{\begin{array}{l} 2y-y+3z-z=20-12=8 \\ y+2z=8 \end{array}\right.$$
$$\left\{\begin{array}{l} 36-3y-6z=24-2y-2z \\ 12=y+4z \end{array}\right.$$
$$\text{whence } y=\left\{\begin{array}{l} 8-2z \text{ firft} \\ 12-4z \text{ fecond} \end{array}\right\}\text{value}$$
$$\text{and } 8-2z=12-4z$$
$$2z=12-8=4$$
$$z=\tfrac{4}{2}=2$$
$$y(=8-2z)=4$$
$$x(=12-y-z)=6$$

This method is general, and will extend to all equations that involve three unknown quantities; but there are often eafier and fhorter methods, to deduce an equation involving only one unknown quantity, which is beft learned from practice.

Solution of quadratic EQUATIONS. 1. If, after the equation is reduced as directed above, and the unknown quantity brought to ftand on one fide, it is found to be a fimple fquare power, all that you have to do is to evolve both fides of the equation, by which means you will find the value of the fimple unknown quantity. Thus, if $xx=36$; then, by evolution or extraction, $x=6$. See the article EXTRACTION.

2. In the folution of any queftion, where you have got an equation that involves only one unknown quantity, but involves at the fame time the fquare of that quantity, and the product of it multiplied by fome known quantity; then you have what is called an adfected quadratic equation, which may be refolved by the following rules: 1. Tranfpofe all the terms that involve the unknown quantity to one fide, and the known terms to the other fide of the equation. 2. If the fquare of the unknown quantity is multiplied by any coefficient, you are to divide all the terms by that coefficient, that the coefficient of the fquare of the unknown quantity may be unit. 3. Add to both fides the fquare of half the coefficient prefixed to the unknown quantity itfelf, and the fide of the equation that involves the unknown quantity will then be a complete fquare. 4. Extract the fquare root from both fides of the equation, which you will find, on one fide, always to be the unknown quantity with half the forefaid coefficient fubjoined to it; fo that by tranfpofing this half, you may obtain the value of the unknown quantity expreffed in known terms. Thus, fuppofe the quadratic equation to be,

$$y^2+ay=b$$

Add the fquare of $\frac{a}{2}$ to both fides, $\quad y^2+ay+\frac{a^2}{4}=b+\frac{a^2}{4}$

Extract the root, $\quad y+\frac{a}{2}=\pm\sqrt{b+\frac{a^2}{4}}$

Tranfpofe $\frac{a}{2}$, and $\quad y=\sqrt{b+\frac{a^2}{4}}-\frac{a}{2}$

Here it is to be obferved, that the fquare root of any quantity, as $+a^2$, may be $+a$, or $-a$; and hence all quadratic equations admit of two folutions. Alfo,

ſince the ſquares of all quantities are poſitive, it is evident that the ſquare root of a negative quantity is imaginary, and cannot be aſſigned. However, the following examples will illuſtrate the rules for quadratic equations.

Example I. The ſum of two quantities is 32, and their product 240; required the quantities themſelves? Suppoſe them to be x and y: then

$$x+y=32\text{; and } x=32-y$$

$$xy=240\text{; and } x=\frac{240}{y}$$

$$\text{therefore } 32-y=\frac{240}{y}$$

$$\text{and } 32y-y^2=240$$

$$\text{tranſpoſe, } y^2-32y=-240$$

$$\text{add } 16^2,\ y^2-32y+256=-240+256$$

$$\text{extract } \surd,\ y-16=\pm\surd.16$$

$$\text{and } y=\pm\sqrt{16}+16=20$$

$$x(=32-y)=12$$

Example II. Three merchants join ſtocks; the ſtock of the firſt was leſs than that of the ſecond by 13 l. and the ſum of the ſecond and third man's ſtock amounted to 175 l. In trading they gained 48 l. more than their whole ſtock was; and the firſt man's ſhare of the gain was 78 l. required each man's ſtock and ſhare of the gain?

Suppoſe	1	z, y, x, to repreſent each man's ſtock,
Then	2	$x+y+z=s=$ the whole ſtock,
	3	$s+48=$ the whole gain.
By the queſtion	4	$x+13=y$
	5	$y+z=175$
$5+x$	6	$x+y+z=175+x$
2, 6	7	$s=175+x$
7, 3	8	$s+48=223+x$
By the queſtion	9	$175+x : 223+x :: x : 78$
$9\times$	10	$x^2+223x=78x+13650$
$10-78x$	11	$x^2+145x=13650$
11 □	12	$x^2+145x+5256{,}25=18906{,}25$
12 vw^2	13	$x+72{,}5=\sqrt{18906{,}25}=137{,}5$
$13-72{,}5$	14	$x=137{,}5-72{,}5=65$
14,4	15	$y=x+13=78$
5,15	16	$z=175-y=97$
Then	17	$65+78+97+48=288$ the whole gain
And	18	y's gain $=93$ l. 12 s. and z's $=116$ l. 8 s.

Solution of cubic EQUATIONS. The ſecond term of a cubic equation can be taken away, ſo that it may be transformed to this form $x^3 * +qx+r=0$. See TRANSFORMATION *of Equations.*

Let us ſuppoſe that $x=a+b$; and $x^3+qx+r=a^3+3a^2b+3ab^2+b^3+qx+r=a^3+3ab\times\overline{a+b}+b^3qx+r=a^3+3abx+b^3+qx+r=$(by ſuppoſing $3ab=-q$) $a^3+b^3+r=0$. But $b=-\frac{q}{3a}$, and $b^3=-\frac{q^3}{27a^3}$, and conſequently $a^3-\frac{q^3}{27a^3}+r=0$; or, $a^6+ra^3=\frac{q^3}{27}$. Suppoſe $a^3=z$, and you have $z^2+rz=\frac{q^3}{27}$; which is a quadratic, the reſolution whereof gives

$$z=-\tfrac{1}{2}r\pm\sqrt{\tfrac{1}{4}r^2+\frac{q^3}{27}}=a^3\text{, and}$$

$$a=\sqrt[3]{-\tfrac{1}{2}r\pm\sqrt[2]{\tfrac{1}{4}r^2+\frac{q^3}{27}}}\text{; and}$$

$$x=a+b=a-\frac{q}{3a}=\sqrt[3]{-\tfrac{1}{2}r\pm\sqrt[2]{\tfrac{1}{4}r^2+\frac{q^3}{27}}}-\frac{q}{3\times\sqrt[3]{-\tfrac{1}{2}r\pm\sqrt[2]{\tfrac{1}{4}r+\frac{q^3}{27}}}}$$

in which expreſſions there are only known quantities. This method is commonly called Cardan's rule.

But when, in a cubic equation $x^3 - qx \pm r$, q is negative; in this caſe the expreſſion $\sqrt{\frac{1}{4}r^2 + \frac{1}{27}q^3}$, will be transformed into $\sqrt{\frac{1}{4}r^2 - \frac{1}{27}q^3}$; which root becomes impoſſible, or imaginary, when $\frac{1}{27}q^3$ is greater than $\frac{1}{4}r^2$, as being the ſquare root of a negative quantity. And yet, even in this caſe, the root x may be a real quantity; though algebraiſts have not, hitherto, been able to find a real expreſſion of its value. See the article IRREDUCIBLE.

Again, any cubic equation may be reduced to this form, and the value of x diſcovered, without exterminating the ſecond term.

$$\left.\begin{array}{l} x^3 - 3px^2 - 3qx - 2r \\ \quad + 3p^2x - p^3 \\ \quad\quad + pq \end{array}\right\} = 0;$$ which

by ſuppoſing $x = z + p$, will be reduced to $x^3 * - 3qz - 2r = 0$, in which the ſecond term is wanting. But, from what is advanced above, it follows that $z = \sqrt[3]{r + \sqrt{r^2 - q^3}} + \sqrt[3]{r - \sqrt{r^2 - q^3}}$ = (if you ſuppoſe that the cubic root of the binomial $r + \sqrt{r^2 - q^3}$ is $m + \sqrt{n}$) $= m + \sqrt{n} + m - \sqrt{n} = 2m$. And, ſince $x = z + p$, it follows that $x = p + 2m$. But, as the ſquare root of any quantity is twofold, ſo the cubic root is threefold, and can be expreſſed three different ways. See the article ROOT.

Example: let it be required to find the roots of the equation $x^3 - 12x^2 + 41x - 42 = 0$.

Comparing the coefficients of this equation with theſe of the general equation, *viz.*

$$x^3 - 3px^2 \left.\begin{array}{l} -3q \\ +3p^2 \end{array}\right\} x \left.\begin{array}{l} -2r \\ -p^3 \\ +3pq \end{array}\right\} = 0,$$ you

will find $3p = 12$, ſo that $p = 4$; $3p^2 - 3q$ $(= 48 - 3q) = 41$, ſo that $q = \frac{7}{3}$; and $3pq - p^3 - 2r$ $(= -36 - 2r) = 42$ ſo that $r = 3$. And conſequently $r^2 - q^3 = 9 - \frac{343}{27} = -\frac{100}{27}$, and $r + \sqrt{r^2 - q^3} = 3 + \sqrt{-\frac{100}{27}}$. Now the cubic root of this binomial is found to be $-1 + \sqrt[2]{-\frac{4}{3}}$ $(= m + \sqrt{n})$; whence

1°. $x = p + 2m = 4 - 2 = 2$.

2°. $x = p - m - \sqrt{-3n} = 4 + 1 - \sqrt{4} = 5 - 2 = 3$.

3°. $x = p - m + \sqrt{-3n} = 5 + 2 = 7$.

So that the three roots of the propoſed equation are 2, 3, and 7.

Solution of biquadratic EQUATIONS. The roots of theſe may be found by reducing them to cubic ones, thus:

Let the ſecond term be taken away, as directed under the article TRANSFORMATION *of equations*.

And let the equation that reſults, be $x^4 * + qx^2 + rx + s = 0$. Suppoſe this biquadratic to be the product of theſe two quadratic equations.

$x^2 + ex + f = 0$.

$x^2 - ex + g = 0$

$$x^4 * \left.\begin{array}{l} +f \\ +g \\ -e^2 \end{array}\right\} \times x^2 \left.\begin{array}{l} +eg \\ -ef \end{array}\right\} \times x + fg = 0.$$

Where e is the coefficient of x in both equations, but affected with contrary ſigns; becauſe when the ſecond term is wanting in an equation, the ſum of the affirmative roots muſt be equal to the ſum of the negative.

Compare now the propoſed equation with the above product, and the reſpective terms put equal to each other, will give $f + g - e^2 = q$, $eg - ef = r$, and $fg = s$. Whence it follows, that $f + g = q + e^2$, and $g - f = \frac{r}{e}$; and conſequently, $f + g + g - f (= 2g) = q + e^2 + \frac{r}{e}$, and $g = \frac{q + e^2 + \frac{r}{e}}{2}$. In the ſame manner you will find, by ſubtraction, &c. $f = \frac{q + e^2 - \frac{r}{e}}{2}$, and $f \times g\ (= s) = \frac{1}{4} \times \overline{q^2 + 2qe^2 + e^4 - \frac{r^2}{e^2}}$; and, multiplying by $4e^2$, and ranging the terms, you have this equation, $e^6 + 2qe^4 + \overline{q^2 - 4s} \times e^2 - r^2 = 0$. Suppoſe $e^2 = y$, and it becomes $y^3 + 2qy^2 + \overline{q^2 - 4s} \times y - r^2 = 0$, an equation whoſe roots are to be diſcovered by the method of reſolving cubic equations.

Then the values of y being found, their ſquare roots will give e (ſince $y = e^2$; and

and having e, you will find f and g, from the equations $f = \frac{q + e^2 - \frac{r}{e}}{2}$, and $g = \frac{q + e^2 + \frac{r}{e}}{2}$. Laſtly, extracting the roots of the roots of the equations $x^2 + ex + f = 0$, and $x^2 - ex + g = 0$, you will find the four roots of the biquadratic $x^4 * + qx^2 + rx + s = 0$; for either $x = -\frac{1}{2}e \pm \sqrt{\frac{1}{4}e^2 - f}$, or $x = +\frac{1}{2}e \pm \sqrt{\frac{1}{4}e^2 - g}$.

Or you may find the roots of a biquadratic, without taking away the ſecond term. Suppoſe it to be of this form,

$$x^4 - 4px^3 \begin{matrix} -2q \\ +4p^2 \end{matrix}\Big\} x^2 \begin{matrix} -8r \\ +4pq \end{matrix}\Big\} x \begin{matrix} -4s \\ +q^2 \end{matrix}\Big\} = 0.$$

then the values of x will be

$$\left.\begin{matrix} x = p - a \pm \sqrt{p^2 + q - a^2 - \frac{2r}{a}} \\ \text{and } x = p + a \pm \sqrt{p^2 + q - a^2 + \frac{2r}{a}} \end{matrix}\right\}$$

where a^2 is equal to the root of the cubic equation

$$y^3 \begin{matrix} -p^2 \\ -q \end{matrix}\Big\} y^2 \begin{matrix} +2pr \\ +s \end{matrix}\Big\} y - r^2 = 0.$$

Every equation has as many roots, as the unknown quantity of the firſt term has dimenſions, or as the exponent thereof contains units. See the articles ROOT and EXPONENT.

All equations have as many affirmative roots as there are permutations of ſigns; and as many negative roots as there are ſucceſſions of them: thus, in the quadratic $x^2 + x - 6 = 0$, there is only one ſucceſſion of ſigns, $+ +$; and one permutation of them, $+ -$; hence the equation has two roots, one affirmative $+2$, and the other negative -3. Alſo in the cubic equation $x^3 - 3x^2 - 10x + 24 = 0$, there are two permutations of ſigns, $+ -$ and $- +$; and only one ſucceſſion $- -$: hence its roots are found to be two affirmative $+2$ and $+4$, and only one negative -3.

For the methods of approximating to the roots of equations, by means of their limits and serieſes, ſee the articles LIMIT and SERIES.

Conſtruction of EQUATIONS. See the article CONSTRUCTION.

Exponential EQUATION. See the article EXPONENTIAL.

Tranſcendental EQUATION. See the article TRANSCENDENTAL.

Annual EQUATION of the mean motion of the ſun, and moon's apogee and nodes. The annual equation of the ſun's mean motion depends upon the excentricity of the earth's orbit round him, and is $16\frac{1}{12}$ ſuch parts, of which the mean diſtance between the ſun and the earth is 1000; whence ſome have called it the equation of the center, which, when greateſt, is 1° 56′ 20″.

The equation of the moon's mean motion is 11′ 40″; of the apogee, 20′; and of its node, 9′ 30″.

Theſe four annual equations are always mutually proportionable to each other; ſo that when any of them is at the greateſt, the three others will alſo be greateſt; and when one diminiſhes, the reſt diminiſh in the ſame ratio. Wherefore the annual equation of the center of the ſun being given, the other three correſponding equations will be given; ſo that one table of the central equations will ſerve for all. See the article MOON.

EQUATION *of a curve*, an equation expreſſing the nature of a curve, the relation between an abcifs and a correſponding ordinate, or the relation of their fluxions. See the article CURVE.

EQUATION *of time*, in aſtronomy and chronology, the reduction of the apparent time or motion of the ſun, to equable, mean, or true time.

The difference between true and apparent time ariſes from two cauſes, the excentricity of the earth's orbit, and the obliquity of the ecliptic. Thus,

If the earth revolved in the plane of the equator, and in a circle about the ſun, then would the angle A S B (pl. XCIII. fig. 4, n° 1.) and conſequently the angle *eBm*, be always of the ſame quantity; and, therefore, the time of deſcribing the ſaid angle, *e*B*m*, would always be equal; and the ſolar days and hours be equal among themſelves. But neither of theſe two caſes have place in nature; for the earth's orbit being an ellipſis, her annual motion cannot be equable, or the angle ASB *(ibid.)* deſcribed in the ſame ſpace of time, will not be always equal; ſince, in the aphelium, the velocity of the earth will be leſs than in the perihelium, and conſequently the arch A B, and the ſimilar arch *em*, will be leſs; and, therefore, likewiſe the time of deſcribing it. But the moſt conſiderable part of the equation of time is that which ariſes from the plane of the earth's orbit, or ecliptic, being inclined to that of the equator, or plane of the diurnal motion. To explain this

this, let ♈ ♑ ♎ (*ibid.* n° 2.) be a semi-circle of the ecliptic, and ♈ H ♎ of the equinoctial, S the center of the sun, and A that of the earth, in the third quarter of the ecliptic, ♑ ♎; *h f* the meridian passing through the true sun S, and its apparent place at I, in the first quarter of the ecliptic ♈ ♋. Suppose now the motion of the earth in every respect equable, and first that it set out from ♎, and proceeded in the equinoctial in a given time to D; the sun would apparently describe, in the same time, the arch of the equinoctial ♈ I. Again, suppose it set out from the same point, ♎, and spent the same time, with the same equable velocity, in the ecliptic, it would arrive to the point A; so that the arch ♎ A = ♎ D, and ♈ I = ♈ C. Then it is evident, as the earth revolves about its axis from west to east, the meridian of any place will first arrive at the sun I, in the ecliptic, and afterwards at the sun C, in the equinoctial; that is, the time of noon by the sun in the ecliptic will be sooner than that by the sun in the equinoctial, by the quantity of the arch *h* D, turned into time.

Now the arch *h* D = B C is the difference of the sun's longitude ♈ I or ♈ C, and his right ascension ♈ B. Draw *ge* parallel to D C, and the angle *e* A *f* will be equal to the angle D S *h*, and the arch *ef* similar to the arch D *h*. Therefore, the time in which the meridian *hf* revolves into the situation *eg*, is that which is to be added to the ecliptic noon, to equate it with the time of the equinoctial noon, in the first and third quarters of the ecliptic. In the second and fourth quarters the said equation is to be subtracted, as would easily appear, by making the same construction there.

Since, in different parts of the quadrant this arch D *h*, or B C, is of different lengths, the equation of time will be a variable quantity; and, therefore, as the motion and time measured by the sun in the equinoctial is always equal, it follows that the times measured by the sun in the ecliptic must be always unequal; or, in other words, the solar days are sometimes shorter, sometimes longer, than the equal time measured out in the equinoctial.

As the true motion of the earth precedes its mean motion in the first semi-circle of anomaly, and is preceded by the mean in the second, it follows, that while the earth is going from the aphelium to the perihelium, or while the sun apparently moves from the apogæum to the perigæum, the apparent time will be before the mean; and, in the other semi-circle of anomaly, it will be after it. The difference of these motions, converted into time, is the equation of time in this respect, and is to be subtracted from the apparent time to gain the mean, or added to the mean to gain the apparent, in the first semi-circle of anomaly; and, *vice versa*, in the latter.

Both these parts of the equation of time are calculated by astronomers for every degree of the sun's longitude in the ecliptic, and disposed in tables with directions for adding or subtracting, as the case requires; by which means the true equal time may, at all times, be had.

From what has been said it appears, that the apparent time, or that shewn by a sun-dial, is but four days in the whole year the same, with the mean or equal time, shewn by a good clock or watch, *viz.* about April 15, June 17, Aug. 31, and Dec. 24. It is also remarkable, that about the third of November the equation is greatest of all, clocks being then about 16′ 13″ slower than sun-dials.

As, therefore, the solar days are unequal, the hours must be so of course; and, according as the above-mentioned causes, which are independent on each other, concur, or counteract each other, this inequality is more or less. Besides, as the former of these causes, *viz.* the excentricity of the earth's orbit, is affected by the precession of the equinoxes, tables of the equation of time, made for any year, must continually afterwards deviate more and more from the truth; yet, as this variation is extremely slow, the same tables may very well serve for an age, or more, without any sensible error.

Here follows a table of the equation of time, calculated for the new or gregorian stile, and shewing how much equal or true time is faster or slower than apparent time, for every day throughout the year; or, which comes to the same thing, how many minutes or seconds a good clock or watch is faster or slower than a good sun-dial.

Days

Days.	Januar. Faster Min.	Sec.	Febr. Faster Min.	Sec.	March Faster Min.	Sec.	April Faster Min.	Sec.	May Slower Min.	Sec.	June Slower Min.	Sec.	July Faster Min.	Sec.	August Faster Min.	Sec.	Sept. Slower Min.	Sec.	Octob. Slower Min.	Sec.	Nov. Slower Min.	Sec.	Dec. Slower Min.	Sec.
1	4	6	14	13	12	48	4	1	3	8	2	47	3	8	5	46	0	18	10	23	16	13	10	32
2	4	34	14	20	12	36	3	43	3	16	2	38	3	19	5	42	0	36	10	42	16	13	10	9
3	5	2	14	27	12	23	3	25	3	23	2	29	3	31	5	38	0	55	11	0	16	13	9	45
4	5	30	14	32	12	9	3	6	3	30	2	19	3	42	5	33	1	14	11	18	16	12	9	20
5	5	57	14	37	11	55	2	48	3	36	2	9	3	52	5	28	1	34	11	36	16	10	8	55
6	6	24	14	41	11	41	2	30	3	42	1	59	4	2	5	22	1	54	11	53	16	8	8	29
7	6	50	14	44	11	26	2	13	3	47	1	48	4	12	5	15	2	14	12	10	16	4	8	3
8	7	16	14	47	11	11	1	55	3	51	1	37	4	22	5	8	2	34	12	27	16	0	7	37
9	7	41	14	48	10	56	1	38	3	55	1	26	4	31	5	0	2	54	12	43	15	54	7	10
10	8	6	14	49	10	40	1	21	3	58	1	14	4	40	4	52	3	14	12	58	15	48	6	42
11	8	30	14	49	10	24	1	4	4	0	1	2	4	48	4	43	3	35	13	13	15	41	6	14
12	8	59	14	48	10	7	0	48	4	2	0	50	4	56	4	34	3	55	13	28	15	34	5	46
13	9	22	14	47	9	50	0	32	4	4	0	38	5	4	4	24	4	16	13	42	15	25	5	18
14	9	44	14	44	9	33	0	16	4	5	0	26	5	11	4	13	4	37	13	56	15	16	4	49
15	10	5	14	41	9	16	0	** 1	4	5	0	13	5	17	4	2	4	58	14	9	15	6	4	19
16	10	26	14	37	8	58	0	14	4	5	0	** 1	5	23	3	50	5	19	14	22	14	55	3	50
17	10	46	14	33	8	40	0	29	4	4	0	12	5	29	3	38	5	40	14	33	14	43	3	20
18	11	5	14	28	8	22	0	43	4	2	0	25	5	34	3	26	6	1	14	45	14	30	2	51
19	11	24	14	22	8	4	0	57	4	0	0	38	5	39	3	12	6	22	14	56	14	16	2	21
20	11	42	14	15	7	46	1	11	3	58	0	50	5	43	2	59	6	42	15	6	14	2	1	51
21	11	59	14	8	7	27	1	24	3	55	1	3	5	46	2	45	7	3	15	15	13	46	1	20
22	12	15	14	0	7	9	1	37	3	51	1	16	5	49	2	30	7	24	15	24	13	30	0	50
23	12	30	13	52	6	50	1	49	3	47	1	29	5	51	2	15	7	44	15	32	13	13	0	** 20
24	12	45	13	43	6	31	2	1	3	42	1	42	5	53	2	0	8	5	15	40	12	56	0	10
25	12	59	13	33	6	13	2	12	3	37	1	55	5	54	1	44	8	25	15	46	12	38	0	40
26	13	12	13	22	5	54	2	23	3	31	2	7	5	55	1	28	8	45	15	52	12	18	1	10
27	13	24	13	12	5	35	2	33	3	25	2	20	5	55	1	11	9	5	15	58	11	58	1	40
28	13	36	13	0	5	16	2	43	3	18	2	32	5	54	0	54	9	25	16	2	11	38	2	10
29	13	46			4	57	2	52	3	11	2	44	5	53	0	36	9	45	16	6	11	17	2	39
30	13	56			4	39	3	0	3	3	2	56	5	51	0	19	10	4	16	9	10	55	3	8
31	14	5			4	20			2	55			5	49	0	** 1			16	11			3	37

January: Equal time faster as far as the two asterisks.
April: * Equal time slower to the next asterisks.
June: * Equal time faster to the next asterisks.
September: Equal time slower as far as the next two asterisks.
December: * Equal time faster.

EQUATOR, in geography, a great circle of the terrestrial globe, equidistant from its poles, and dividing it into two equal hemispheres; one north, and the other south. See the article GLOBE.

It passes through the east and west points of the horizon, and at the meridian is raised as much above the horizon as is the complement of the latitude of the place. From this circle, the latitude of places, whether north or south, begin to be reckoned, in degrees of the meridian. See LATITUDE and MERIDIAN.

All people living on this circle, called by geographers and navigators, the line, have their days and nights constantly equal. See the article EQUINOCTIAL.

It is in degrees of the equator, that the longitude of places are reckoned; and as the natural day is measured by one revolution of the equator, it follows that one hour answers to $\frac{360}{24} = 15$ degrees: hence one degree of the equator will contain four minutes of time; fifteen minutes of a degree will make a minute of an hour; and consequently, four seconds answer to one minute of a degree.

EQUERRY, in the british customs, an officer of state, under the master of the horse.

There are five equerries, who ride abroad with his majesty; for which purpose they give their attendance monthly, one at a time, and are allowed a table.

As to the equerries of the crown-stable, they have this distinct appellation, as being employed in mounting, managing, and breaking the saddle-horses for his majesty's use, and holding his stirrup.

EQUES AURATUS, is used for a knight batchelor, called *auratus*, q. d. *gilt*, because antiently none but knights were allowed to beautify their armour, or other habiliments for war, with gold.

This term is not used in law, but instead of it *miles & chevalier* are made use of.

EQUESTRIAN STATUE, signifies the statue of a person mounted on horseback.

EQUESTRIAN ORDER, among the Romans, signified their knights, or equites; as also their troopers, or horsemen in the field; the first of which orders stood in contradistinction to the senators, as the last did to the foot, military or infantry: each of these distinctions was introduced into the state by Romulus. See the articles KNIGHT and SENATOR.

EQUIANGULAR, in geometry, an epithet given to figures, whose angles are all equal: such are a square, an equilateral triangle, *&c.*

EQUICRURAL, in geometry, the same with isosceles. See the article ISOSCELES TRIANGLE.

EQUIDIFFERENT NUMBERS, in arithmetic, are of two kinds. 1. Continually equidifferent is when, in a series of three numbers, there is the same difference between the first and second, as there is between the second and third; as 3, 6, 9. And, 2. Discretely equidifferent, is when in a series of four numbers or quantities, there is the same difference between the first and second as there is between the third and fourth: such are 3, 6, 7, 10.

EQUIDISTANT, an appellation given to things placed at equal distance from some fixed point, or place, to which they are referred.

EQUILATERAL, in general, something that hath equal sides, as an equilateral angle.

EQUILATERAL HYPERBOLA, one whose transverse diameter is equal to its parameter; and so all the other diameters, equal to their parameters: in such an hyperbola, the asymptotes always cut one another at right angles in the center. Its most simple equation, with regard to the transverse axis, is $y^2 = x^2 - a^2$; and, with regard to the conjugate, $y^2 = x^2 + a^2$, when a is the semitransverse, or semiconjugate. The length of the curve cannot be found by means of the quadrature of any space, of which a conic section is any part of the perimeter. See the article HYPERBOLA.

EQUILIBRIUM, in mechanics, is when the two ends of a lever or balance hang so exactly even and level, that neither doth ascend or descend, but keep in a position parallel to the horizon; which is occasioned by their being both charged with an equal weight.

EQUIMULTIPLES, in arithmetic and geometry, are numbers and quantities multiplied by one and the same number or quantity. Hence, equimultiples are always in the same ratio to each other, as the simple quantities before multiplication: thus, if 6 and 8 are multiplied by 4, the equimultiples 24 and 32 will be to each other, as 6 to 8.

EQUINOCTIAL, in astronomy, a great circle of the celestial globe, whose poles are the poles of the world.

It is so called, because whenever the sun comes to this circle, the days and nights are equal all over the globe; being the same with that which the sun seems to describe, at the time of the two equinoxes of spring and autumn. See the article EQUINOX.

All stars, directly under this circle, have no declination, and always rise due east, and set full west. The hour circles are drawn at right angles to it, passing thro' every fifteenth degree; and the parallels to it are called parallels of declination. See the articles DECLINATION and CIRCLE.

EQUINOCTIAL COLURE, DIAL, HOUR, LINE, OCCIDENT, ORIENT, POINT, *&c.* See COLURES, DIAL, HOUR, LINE, OCCIDENT, ORIENT, POINT, *&c.*

EQUINOX, the time when the sun enters either of the equinoctial points, where the ecliptic intersects the equinoctial. See the preceding article.

It is so called, because when the sun is in these points, the days and nights are of an equal length all the world over. As the sun is in one of them, in the spring, *viz.* March 20th, it is called the vernal equinox; and in the other, in autumn, *viz.* September 23d, it is called the autumnal equinox.

Precession of the EQUINOXES. See the article PRECESSION.

EQUINUS BARBATUS, in aftronomy, a kind of comet, called alfo hippeus. See the article HIPPEUS.

EQUIPOLLENCE, in logic, is when there is an equivalence, or agreement, either as to the nature of the thing, or as to the grammatical fenfe of any two or more propofitions; that is, when two propofitions fignify one and the fame thing, though they exprefs it after different manners.

EQUISETUM, HORSE-TAIL, in botany, a genus of the cryptogamia clafs of plants, and order of filices, or ferns; the fructifications of which are difpofed on an oblong fpike, and are of an orbicular figure, dividing in various angles from the bafe. The plant itfelf confifts of jointed ftalks, in fome fimple, in others branched; producing fetæ, or fmaller divifions, of the fame ftructure with the larger ones.

Horfe-tail is accounted vulnerary, and aftringent, and therefore prefcribed in hæmorrhages, and injuries of the kidneys and bladder.

EQUITY, in a general fenfe, the virtue of treating all other men according to common reafon and juftice, or as we would be gladly treated ourfelves, when we underftand aright what is our due. Equity is faid to be of two kinds, the one of which abridges, and takes from the letter of the law, whilft the other enlarges, and adds thereto. The firft is a correction of the law, generally made in that part wherein it fails, or is too fevere, as where it is enacted that whofoever commits fuch a thing fhall be deemed a felon, and fuffer death: here, if a madman, or an infant, that has no difcretion, commit the fame, they fhall not be deemed felons, nor fuffer death for it; and where a perfon, to fave his life, kills another that affaults him, tho' in general all killing is felony, this, by the law of reafon, will be excufed.

The other equity is defined to be an extenfion of the words of the law to cafes unexpreffed, yet having the fame reafon: as for example, the ftatute which ordains, that in an action of debt againft executors, he that appears by diftrefs fhall anfwer; this, by equity, extends to adminiftrators, for fuch of them as appears firft fhall, by the equity of the faid act, anfwer, becaufe they are of the like kind and degree.

EQUITY *of redemption*, in our law, is applied to mortgages, as where money being due on a mortgage, the mortgagee is defirous to bar the mortgager's equity of redemption, that is, his right to redeem the mortgage. In this cafe the mortgagee may oblige the mortgager, either to pay the money, or to be foreclofed of his equity of redemption. The practice is to exhibit a bill, to which anfwer being put in, and a decree obtained, a mafter of that court certifies what is due for principal, intereft, and cofts, which is to be paid within the time limited by the decree, and thereupon the eftate mortgaged is to be conveyed to the mortgager, otherwife for default of payment, the mortgager is decreed to be foreclofed from all equity of redemption, and abfolutely to convey the mortgaged premifes to the mortgagee. See the article MORTGAGE.

EQUITY alfo frequently fignifies the court of chancery, where controverfies are determined according to the exact rules of equity and confcience, by mitigating the rigor of the common law; though even by the common and ftatute law there is alfo an equity. See the article CHANCERY.

Equitas fequitur legem, is an old maxim in law, but from the great increafe of fuits in chancery, fome have thought fit to give it this conftruction, that in all caufes, after a man hath been at law, he muft go to equity.

EQUIVALENT, an appellation given to things which agree in nature, or other circumftances, as force, virtue, *&c.*

EQUIVOCAL TERMS, or WORDS, among logicians, are thofe which have a doubtful, or double meaning.

According to Mr. Locke, the doubtfulnefs and uncertainty of words has its caufe more in the ideas themfelves, than in any incapacity of the words to fignify them; and might be avoided, would people always ufe the fame term to denote the fame idea, or collection of ideas: but, adds he, it is hard to find a difcourfe on any fubject where this is the cafe; a practice which can only be imputed to folly, or great difhonefty; fince a man, in making up his accompts, might with as much fairnefs ufe the numeral characters fometimes for one, fometimes for another collection of units.

EQUIVOCAL ACTION is, where the effect is of a different kind from the caufe producing it.

EQUIVOCAL CAUSE. See CAUSE.

EQUIVOCAL GENERATION, the production

duction of animals, without the intercourse between the sexes, by the influence of the sun or stars, &c.

The equivocal generation of plants, is their production without seed, in the ordinary course of nature. See the article GENERATION.

This kind of generation is now quite exploded by the learned. Mr. Ray is clearly of opinion, that there is no such thing as spontaneous or equivocal generation; but that all animals are the issue of parents of the same species with themselves; and with him agree Redi, Willoughby, and Lister. This last author hath fully refuted the vulgar notion, that horse-hairs, thrown into water, will become animated bodies; by shewing, that appearances of this kind are hair-worms bred in the bodies of other insects, and particularly of the common black beetle.

EQUIVOCATION, in ethics, the crime of wilfully using equivocal terms. See the article EQUIVOCAL.

EQUULEUS, or ECUULEUS, in antiquity, a kind of rack used for extorting a confession, at first chiefly practised on slaves, but afterwards made use of against the christians.

The equuleus was made of wood, having holes at certain distances, with a screw, by which the criminal was stretched to the third, sometimes to the fourth, or fifth holes, his arms and legs being fastened on the equuleus with cords; and thus was hoisted aloft, and extended in such a manner, that all his bones were dislocated. In this state red hot plates were applied to his body, and he was goaded in the sides with an instrument called ungula.

EQUULEUS, in astronomy, a constellation of the northern hemisphere, whose stars, according to Ptolemy, and Tycho's catalogues, are four, but in Mr. Flamsteed's ten.

EQUUS, the HORSE, in zoology. See the article HORSE.

ERANARCHA, a public officer among the antient Greeks, whose business was to preside over, and direct, the alms and provisions made for the poor. Cornelius Nepos, in his life of Epaminondas, describes the office thus; when any person was reduced to poverty, taken captive, or had a daughter to marry, which he could not effect for want of money, &c. the eranarcha called an assembly of friends and neighbours, and taxed each according to his means and estate, to contribute towards his relief.

ERANTHEMUM, in botany, a genus of the diandria-monogynia class of plants, the calyx of which is a quinquefid, tubular, very narrow, erect, short, acuminated and permanent perianthium, the corolla is funnel-shaped, the tube filiform, and the stigma single.

ERASED, in heraldry, the same with arrache. See article ARRACHEE.

It also denotes parts of animals torn, not cut off, from the part to which nature fixed them.

ERECT FLOWERS, such as grow upright without hanging or reclining the head. See the article FLOWER.

ERECT DIAL. See the article DIAL.

ERECT-VISION. See VISION.

ERECTION, in a general sense, the art of raising or elevating any thing, as the erection of a perpendicular, &c.

ERECTION is also used in a figurative sense, as the erection of a bishoprick, marquisate, &c.

ERECTION is particularly used by medical writers, for the state of the penis when swelled and distended by the action of the muscles called erectores. See the articles PENIS and ERECTOR.

There is also an erection of the clitoris, which is performed by muscles for that purpose, called also erectores. See the articles ERECTOR and CLITORIS.

De Graaf assigns two kinds of vessels with its muscles, for the performance of this office; the nerves, by which the animal spirits flow into its membranous parts, and render them more rigid and tumid, and the arteries carrying the blood to distend the corpora cavernosa.

ERECTOR CLITORIS, in anatomy, one of the two muscles of the clitoris that serve for its erection.

The erectores of the clitoris arise from the ossa ischii, and are inserted into the corpora cavernosa.

ERECTOR PENIS, one of the two muscles of the penis, that serve for its erection. These arise on each side from the ossa ischii between the tubercle of this bone and the beginning of the corpus cavernosum, and each of them is inserted into the corpus cavernosum of its own side. These muscles when they act together, press the veins of the back of the penis against the ossa pubis, by which they prevent the reflux of blood from the penis; and consequently when at the same time the blood flows impetuously into the part by the arteries, and cannot get back this way, the penis becomes erected.

EREMIT, or HERMIT. See HERMIT.

EREMITA, the HERMIT, in zoology, a ſpecies of ſquill, with a long ſoft tail, and the right claw the larger. See the article SQUILL.

Authors call it cancellus, or the little crab, as being only two inches and a half in length.

ERETRIAN EARTH, in natural hiſtory, a kind of bole. See the article BOLE.

ERFURT, a large and beautiful city of Upper Saxony, in Germany, capital of Thuringia, and ſubject to the elector of Mentz: eaſt long. 11° 6′, north lat. 51°.

ERGOT, in farriery, is a ſtub, like a piece of ſoft horn, about the bigneſs of a cheſnut, placed behind and below the paſtern-joint, and commonly hid under the tuft of the fet-lock.

To diſergot, or to take it out, is done by cleaving it to the quick, with an inciſion-knife, in order to pull up a bladder full of water, that lies covered with the ergot. This operation is ſcarce ever performed in France, but in Holland 'tis frequently performed upon all four legs, with intent to prevent watery ſores, and other foul ulcers.

ERICA, HEATH, in botany. See the article HEATH.

ERICHTHONIUS, in aſtronomy, a conſtellation more uſually called auriga. See the article AURIGA.

ERIDANUS, in aſtronomy, a conſtellation of the ſouthern hemiſphere; containing, according to different authors, 19, 30, or even 68 ſtars.

ERIE, a vaſt lake to the weſtward of Penſylvania, in North America, ſituated between 80° and 87° weſt long. and between 41° and 42° north lat.

ERIGERON, SWEET FLEABANE, in botany, a genus of the ſyngeneſia polygamia ſuperflua claſs of plants, the compound flower whereof is radiated; the partial hermaphrodite one infundibuliform; and the female flower is ligulated, linear, and ſubulated: The fruit has no pericarpium, the cup is connivent: the ſeeds of the hermaphrodite flower are oblong, ſmall, and crowned with long down. This plant is a diuretic, and promotes the menſes: the ſmell of it drives away flies, and kills lice and other like vermin.

ERINACEUS, in zoology, the name by which authors call the hedge-hog. See the article HEDGE-HOG.

ERINGO, in botany, the engliſh name of the eryngium. See ERYNGIUM.

ERINUS, in botany, a genus of the didynamia-angioſpermia claſs of plants; the corolla whereof conſiſts of a ſingle, unequal petal; the tube is ovato cylindric, of the length of the cup, and reflected; and the limb is plane, and divided into five ſegments; the fruit conſiſts of bilocular capſules, ſurrounded by the cup; the ſeeds are numerous and ſmall.

ERIOCAULON, in botany, a genus of the triandria trigynia claſs of plants, the general corolla of which is uniform and convex; the partial flower conſiſts of three lanceolated, obtuſe, hairy petals, narrow at the baſe, where they all three unite into one ſtyliform hairy pedicle: the cup changes into a capſule, and contains a ſingle ſeed winged with down.

ERIOCEPHALUS, in botany, a genus of the ſyngeneſia polygamia neceſſaria claſs of plants, the compound flower of which is radiated; the proper hermaphrodite one is funnel-ſhaped; the female ones, being five in number, are ligulated in the radius: there is no pericarpium: the ſeed of the hermaphrodite produces no fruit; the ſeed of the female is ſingle, roundiſh, naked, and placed vertically.

ERIOPHORUM, in botany, a genus of the triandria monogynia claſs of plants, without any flower petals: the cup is a ſpike imbricated with oval, and oblong ſquamæ; the ſeed is a triquetrous and acuminated ſeed, furniſhed with hairs longer than the ſpike.

ERIVAN, a city of Perſia, on the frontiers of Turky, ſituated on the ſouth end of a lake of the ſame name: eaſt long. 45°, north lat. 40° 6′.

ERKELENS, a city of Weſtphalia, in Germany, ten miles north of Juliers: eaſt long. 6°, north lat. 51°.

ERMIN, *ermineum*, in zoology, a ſpecies of muſtela, with narrow ears, and of the ſize of the weaſel. See MUSTELA.

The whole body of the ermin is of a pure ſnow-white, except the tip of the tail, which is of a deep black, and ſome ſpots of a greyiſh yellow about the head and ſhoulders. Its fur is much valued. See the article FUR.

ERMIN, in heraldry, is always argent and ſable, that is, a white field, or fur, with black ſpots. Theſe ſpots are not of any determinate number, but may be more or leſs, at the pleaſure of the painter, as the ſkins are thought not to be naturally ſo ſpotted; but ſerving for lining the garments of great perſons, the furriers were wont, in order to add to their beauty, to ſow bits of the black tails of the

the creatures that produced them, upon the white of their ſkin, to render them the more conſpicuous, which alteration was introduced into armoury. See plate LXXXVIII. fig. 4.

Ermin, or Ears of corn, an order of knights in France, inſtituted by Francis the laſt of that name, duke of Britany.

This order was ſo called on account that the collar of it was made up of ears of corn, lying athwart one another in ſaltier, bound together, both above and below, each ear being croſſed twice, the whole of gold. To this collar there hung a little white beaſt, called an ermin, running over a bank of graſs, diverſified with flowers.

ERMINE', or croſs erminé, is one compoſed of four ermin ſpots, placed as repreſented in plate LXXXVIII. fig. 5.

It is to be obſerved, that the colours in theſe arms, are not to be expreſſed, becauſe neither this croſs nor theſe arms can be of any other colour but white and black.

Ermines are, by ſome engliſh writers, held to be the reverſe of erminé, that is, white ſpots on a black field, and yet the French uſe no ſuch word, but call this black powdered with white *contre ermin*, which is very proper, as it denotes the reverſe of ermin. See the article Ermin.

ERMINITES ſhould ſignify little ermines, but it is otherwiſe; for it expreſſes a white field powdered with black, only that every ſuch ſpot hath a little red hair on each.

Erminites alſo ſignify a yellow field powdered with black, which the French expreſs much better by *or ſemée d'ermine de ſable*.

EROSION, among phyſicians, denotes much the ſame with corroſion, only in a ſtronger degree. See the articles Corrosion and Corrosives.

EROTIC, in general, any thing relating to the paſſion love.

Phyſicians take notice of the erotic delirium, or that melancholy occaſioned by exceſſive love.

ERPACH, a city of Franconia, in Germany, capital of a county of the ſame name, and ſituated thirty miles ſouth eaſt of Francfort: eaſt long. 8° 50′, north lat. 49° 42′.

ERQUIKO, a port town of the Red-ſea, on the coaſt of Abex in Africa: eaſt long. 39°, north lat. 17°.

ERRANT, or Itinerant, is a title that is applied to juſtices that go the circuits, and alſo to bailiffs at large.

ERRATA, a liſt of the errors or faults in the impreſſion of a book, generally placed at the beginning thereof.

ERRATIC, in general, ſomething that wanders, or is not regular: hence it is, the planets are called erratic ſtars; as thoſe fevers, which obſerve no regular periods, are denominated erratic fevers.

ERRHINES, ἔῤῥινα, in pharmacy, medicines which, when ſnuffed up the noſe, promote a diſcharge of mucus from that part.

The excretion of the mucous lymph is excellently promoted by errhines and ſternutatories, the former of which ſtimulate the pituitary coats but gently, whereas the latter more forcibly ſtimulate them, to an excretory motion. See the article Sternutatory.

Among the milder kind of the errhines, we may reckon marjoram, baſilicon, thyme, hyſſop, ſavory, marum ſyriacum, the tops of origanum, flowers of lilies of the valley, and benjamin, the reſin of guaiacum, fine raſpings of aloes wood, dry volatile ſalt of ſal-ammoniac perfumed with oil of marjoram, as alſo white vitriol. On the contrary, violent errhines are euphorbium, the powder of white hellebore, and, in a milder degree, ſeveral ſorts of ſnuffs, precipitate mercury, and pepper.

Errhines are more friendly to the conſtitution and nerves than ſternutatories, by their ſubtile, acrid, and volatile ſalt, gently ſtimulating the pituitary membrane, and drawing the mucid humour from it. They are alſo much ſafer than ſternutatories, in their effects.

Errhines prepared of cephalic herbs are of ſingular ſervice in oppreſſive pains of the head, a hemicrania, lethargic diſorders, weakneſſes of memory, ſtuffings of the head, and coryza, mucous defluxions of the eyes, drowſineſs, vertigoes, and in caſes where the malignant humours, generated by the lues venerea, are lodged in the membranes of the noſtrils.

ERROUR, or Error, in philoſophy, a miſtake of our judgment, giving aſſent to that which is not true.

Mr. Locke reduces the cauſe of error to theſe four, firſt, want of proofs; ſecondly, want of ability to uſe them; thirdly, want of will to uſe them; and, fourthly, wrong meaſures of probability.

That great writer obſerves upon the firſt of theſe cauſes of error, that the greateſt part of mankind want conveniencies and opportunities of making experiments and obſervations

observations themselves, or of collecting the testimonies of others, being prevented by the necessity of their condition. Upon the second of these causes he observes, that there are many who from the state of their condition, might bestow time in collecting proofs, but yet are not able to carry a train of consequences in their heads, nor weigh exactly the preponderancy of contrary proofs and testimonies, merely from the difference in mens understandings, apprehensions, and reasonings. Thirdly, he remarks, that though some have opportunities and leisure enough, and want neither parts, learning, nor other helps, that they never come to the knowlege of several truths within their reach, either upon the account of their attachment to pleasure or business; and otherwise because of their laziness or aversion to study. The fourth cause of error, *viz.* wrong measures of probability, he imputes, 1. To the practice of taking for principles propositions that are not in themselves certain and evident, but, on the contrary, doubtful and false. 2. To received hypotheses. 3. Predominant passions or inclinations. And, 4. To authority, or the giving up our assent to the common received opinions either of our friends or party, neighbours or country.

The causes of errors in philosophy, or the reasons why all former philosophers have through so many ages erred, according to lord Bacon, are these following. 1. Want of times suited to learning. 2. The little labour bestowed upon natural philosophy. 3. Few entirely addicted to natural philosophy. 4. The end of the sciences wrong fixed. 5. A wrong way chosen. 6. The neglect of experiments. 7. Regard to antiquity and authority. 8. Admiration of the works in use. 9. The artifice of teachers and writers in the sciences. 10. Ostentatious promises of the moderns. 11. Want of proposing worthy tasks. 12 Superstition and zeal being opposite to natural philosophy, as thinking philosophy dangerous, on account of the school-theology; from the opinion that deep natural enquiries should subvert religion. 13. Schools and academies proving unfavourable to philosophy. 14. Want of rewards. And, 15. Despair and the supposition of impossibility.

ERROR, in law, is a fault committed in pleading, or in a process, whereupon a writ of error is brought to remedy this oversight; and a writ of this kind also lies to redress false judgments, given in any court of record. There is likewise a writ of error to reverse a fine or recoveries.

ERUCA, the CATERPILLAR, in zoology. See the article CATERPILLAR.

ERUCA, the WHITE-ROCKET, in botany, a species of brassica, with lyrate leaves, hairy stalks, and smooth pods. See the article BRASSICA.

ERUCTATIONS, in medicine, are the effect of flatulent foods, and the crudities thence arising. See FLATULENCY.

ERUDITION, *eruditio*, denotes an extensive acquaintance with books, especially such as treat of the belles lettres.

ERUPTION, in medicine, a sudden and copious excretion of humours, as pus or blood: it signifies also the same with exanthema, any breaking out, as the pustules of the plague, small-pox, measles, *&c.* See the article EXANTHEMA, *&c.*

The pestilent eruptions are spots of a purple or red colour; or they are black, or of a violet colour: commonly they are of a round figure, sometimes broad, or of an oblong or some other shape: they shew themselves in the skin up and down the body. See the articles PLAGUE, BUBOE, CARBUNCLE, *&c.*

Spots of a purple, black, greenish, or violet colour, at whatever time they appear, are always fatal signs.

Scabby ERUPTIONS in the heads of children. See the articles CRUSTA LACTEA, and ACHOR.

The heads of children are often troubled with scabby eruptions: these are expelled by the benefit of nature; and before the eruption, the child is often troubled with epileptic fits from the irritation of the morbific matter. If the humour strike in, either spontaneously, or by improper applications; or if the exanthemata are of a blackish colour, they are very dangerous, and the child generally falls into an asthma, or a fatal epilepsy.

Harris prescribes the testaceous powders for infants in this case. Heister, if the child is suspected of the venereal disease, would have a grain or two of mercurius dulcis added with gentle purges between whiles, especially if the body is not loose. Externally, nothing of sulphur or mercury should be applied, or repellent lotions, or any cold thing. To mollify the scabs, fresh butter or calves marrow, or cream, is sufficient. This case often proves obstinate, and then the nurse should observe

observe a strict regimen, use a good diet, take sweeteners of the blood, and purgatives now and then.

ERVUM, Bitter Vetch, a genus of the diadelphia-decandria class of plants, the corolla of which is papilionaceous; the vexillum plane, slightly turned up, and of a roundish form; the alæ are obtuse, and shorter by half than the vexillum; the carina is acuminated, and shorter than the alæ: the fruit is a thick, knotty, obtuse and oblong pod, with protuberant seeds, which are four in number, and of a roundish figure. This plant, abounding with diuretic salt, is recommended for the stone.

ERYNGIUM, Eringo, in botany, a genus of the pentandria-digynia class of plants, the general corolla of which is uniform and roundish; the partial one consists of five oblong petals, knotted together by a longitudinal line. The fruit is of an oval figure, and divisible in two parts: the seeds are oblong and roundish. The root of eryngium is attenuant and deobstruent, and is therefore esteemed a good hepatic, uterine, and nephritic. Its whole virtue consists in the external or cortical part.

ERYSIMUM, hedge-mustard, in botany, a genus of the tetradynamia-siliquosa class of plants, the corolla whereof consists of four oblong, cruciform petals, with a very obtuse point: the fruit is a long, linear, four-cornered pod, consisting of two valves, and divided into two cells: the seeds are numerous, small, and roundish.

This plant is recommended in paralytic and epileptic cases; it expels poison, destroys worms, strengthens the stomach, and cures ulcers of the mouth.

ERYSIPELAS, in medicine, an eruption of a fiery or acrid humour, from which no part of the body is exempted, though it chiefly attacks the face.

As to the material cause of an erysipelas, it seems to be of a caustic, acrid, and putrifying nature; perhaps corrupted bile, which, being conveyed into the mass of blood, indisposes the whole nervous and vascular systems, and excites a fever, till it is at last driven out to the surface of the body. Persons of a sanguine habit, young people, and pregnant women, are most subject to it; and all hot things, violent passions, and whatever occasions other inflammations, likewise give rise to this. See the article Inflammation.

The patient is taken suddenly, whilst he is in the open air, with chilness, a shivering, and other symptoms common in a fever: the part affected swells a little with great pain, and intense redness, and is beset with a vast number of small pustles, which, when the inflammation is increased, are converted into small blisters. The malady gradually creeps further and further, spreads itself from place to place, and is attended with a fever. See the article Fever.

There is another sort, though it seldom happens, commonly arising from a surfeit, or a debauch of drinking spirituous liquors. A small fever which precedes it, is followed presently by an eruption of pustles, almost all over the body, which look like the stings of nettles, and sometimes rise up into bladders: presently they go away again, with an itching scarce tolerable; but as often as they are scratched they appear again.

This distemper has a great affinity with a pestilential fever, as it is attended with most of the symptoms in that case: but this is to be understood of the worst kind of erysipelas. On the third and fourth day, the malignant matter is thrown out on the surface of the body, and then the symptoms a little abate. There is often a pain, redness, and tumour in the inguinal glands, from whence the matter, of a hot, fiery quality, descends to the feet. If the head is attacked, the parotid glands are affected; if the breast, the axillary. The mammary and axillary glands are not seldom ulcerated, and affect the joints with a virulent corruption; and likewise, as in the plague, there is nothing more dangerous than the expelled matter to return back from the surface of the body to the inward parts. In some, especially young persons, the matter is not so violent, nor the fever so great: the glands remain unaffected, and the eruption happens on the second day. This is not at all dangerous. In children, the umbilical region generally suffers, with a fatal event. In a day or two the tumor subsides, the heat and pain cease, the rosy colour turns yellow, the cuticle breaks, and falls off in scales, the danger is over. When the erysipelas is large, deep, and falls upon a part of exquisite sense, the patient is not very safe; but if the red colour changes into black and blue, it will end in a mortification. If the inflammation cannot be discussed, it will suppurate, and bring on fistulas and a gangrene; when the patient is cacochymical, the leg will sometimes swell three times as big as the natural size, and

and is cured with great difficulty. Thofe who die of this difeafe, die of the fever, which is generally attended with difficulty of breathing, fometimes a delirium, fometimes with fleepinefs; and this in feven days time.

Let the patient's diet be water-gruel or barley-broth, with roafted apples. If he drinks any beer, let it be very fmall, and let him keep out of bed fome hours in a day. The medicinal writers do not agree in their opinions, concerning purging in the cure of the eryfipelas; but what they deliver upon this fubject, is full of doubtings and uncertainties, and that at a point of time when the diftemper is moft dangerous and threatning: however it is the general opinion in this cafe, that it is a right practice, more efpecially if the head is affected with an eryfipelas, and there comes upon it a coma, a delirium, or convulfions, wherein the brain is evidently attacked; then purging is the only indication that can afford any hopes of recovering the patient: nor in thefe difficulties fhould the matter be delayed till the fever is abated, or the humour fubfided. Therefore, the beft practice appears to be that of taking away nine or ten ounces of blood, and the next morning giving the patient the common purging potion.

It wll be fafeft to avoid external applications, unlefs a powder made of elder-flowers and liquorice fprinkled on the part; or lime-water mixt with a fourth part of fpirit of wine and camphor, dipping a linen cloth in it feveral times doubled, and applying it hot to the part. An infufion of fcordium, elder-flowers, and fennel-feed, drank in the manner of tea is ufeful to expel the morbific matter. If the difeafe does not yield to the firft bleeding, let it be repeated. If that will not do, let it be reiterated twice more, one day being interpofed between. On the days free from bleeding, prefcribe a clyfter of milk, and fyrup of violets; alfo the cooling emulfion and julep.

Turner commends much a mixture of ol. fambucin. and aqua calcis, with fome fpirit of wine camphorated. A cataplafm of cow's dung is very good to eafe the pain.

In a fymptomatic eryfipelas, the following liniment is good: ℞ Ol. fambucin. lixiv. tenueor. ana p. æ. m. let them be fhaked well in a phial till they unite in an ointment.

In a fcorbutic eryfipelas, befides externals, fudorifics are to be given; as Rob. fambucin. fpi. fambuci bezoar. min. fp. fal. armon. cochlear, *&c.*

ERYTHRINA, CORAL-TREE, in botany, a genus of the diadelphia-decandria clafs of plants, the corolla of which is papilionaceous, and confifts of four petals: the fruit is a very long pod, protuberated by the feeds, terminating in a fmall point, and confifting of one cell; the feeds are kidney-fhaped.

ERYTHRINUS, in ichthyology, a fpecies of fparus, of a ftrong and elegant red colour, and the iris of the eyes of a fine filver-white; its tail is very much forked. See the article SPARUS.

ERYTHROCYANEUS, the red and blue maccaw, with a wedge-like tail, and the fides of the head naked and rugofe.

This bird is undoubtedly, fays Mr. Edwards, the firft of the parrot-kind; being a full yard long, from the point of the bill to the end of the tail, and its plumage adorned with the moft beautiful variety of colours. Its head, neck, breaft, belly, thighs, upper part of the back, and leffer covert feathers of the wings, are of a very fine bright red, or fcarlet-colour. The quill-feathers of the wings are of a very fine blue on their outfides, and a faint red on their under fides; the next feathers above them are of a fine yellow colour, fome of them being tipped with green, as are the blue quills next the back; the lower belly and under fide of the tail, are of a beautiful blue, as are the fhort ones on its upper fide; and its long feathers are red tipped with blue. See plate XCIII. fig. 1.

ERYTHROIDES, in anatomy, the firft of the proper tunics or coats which cover the tefticles. See TESTICLE.

ERYTHRONIUM, DOG'S TOOTH-VIOLET, in botany, a genus of plants belonging to the hexandria-monogynia clafs: the flower confifts of fix oblong and lanceolated petals; and the fruit is a fubglobofe capfule, with three cells, in which are contained numerous ovato-acuminated feeds.

The root of this plant is recommended againft the colic, epilepfy, and worms; it is alfo reckoned a provocative to venery.

ERYTHROPHTHALMUS, the SARFE, or RED EYE, in ichthyology, a fpecies of cyprinus, with the iris of the eye, all the fins, and tail red. See CYPRINUS.

It fomewhat refembles the roach, and is only ten inches in length.

ERZERUM, the capital of the province of Turcomania, or Armenia; eaft long. 41°, north lat. 40°.

It is a great thoroughfare from Perfia and India to Conftantinople, by the way of Trebifond and the Black-fea.

ESCALADE, or SCALADE, in the art of war. See the article SCALADE.

ESCAMBIO, or EXCAMBIO, the fame with exchange. See EXCHANGE.

ESCAPE, in law, a violent or privy evafion out of fome lawful reftraint, without being delivered by due courfe of law. There are two forts of efcapes, voluntary and negligent. Voluntary, when a man arrefts another for felony, or other crime, and afterwards lets him go freely by confent; in which cafe, the party that permits fuch efcape, is held guilty, committed, and muft anfwer for it. Negligent efcape, on the contrary, is where one is arrefted, and afterwards efcapes againft the will of the perfon that arrefted him, and is not purfued with frefh fuit, and re-taken before the perfon purfuing hath loft fight of him. By ftat. 8 & 9 Will. III. c. 26. the keepers of prifons, conniving at efcapes, fhall forfeit 500 l. and, in civil cafes, the fheriff is anfwerable for the debt.

ESCAPE-WARRANT, a procefs which iffues out againft a perfon, committed in the king's bench or fleet prifons, that, without being duly difcharged, takes upon him to go at large.

Upon this warrant, which is obtained on oath, a perfon may be apprehended on a Sunday.

ESCHALOT, *cepa afcalonica*, a fpecies of onion cultivated in gardens, for its ufe in cookery. See the article CEPA.

ESCHAR, in furgery, the cruft or fcab occafioned by burns or cauftic medicines. See the articles BURN and CAUSTIC.

ESCHARA, in botany, a genus of fea-plants, compofed of a gritty matter, but not very hard, of a reticulate texture, and fometimes difpofed in the form of leaves, perforated with numerous roundifh holes: thefe are fo equally diftributed, as to give the whole the appearance of a net. See plate XCIII. fig. 2.

There are feveral fpecies of efchara, diftinguifhed from the fucufes, no lefs by their brittlenefs, than by their net like texture. See the article FUCUS.

ESCHAROTICS, in pharmacy, medicines which produce efchars. See ESCHAR.

ESCHEAT, in law, fignifies any lands or tenements that ufually fall to a lord within his manor, by way of forfeiture, or by the death of his tenant, without any heirs general or fpecial.

The word efcheat is fometimes ufed for the place or circuit within which the king or other lord is entitled to efcheats; alfo for a writ, to recover the fame from the perfon in poffeffion after the tenant's death.

ESCHEATOR, in our old cuftoms, an officer formerly appointed in every county, to make inquefts of efcheats due to the king; but fince abolifhing the court of wards, has been laid afide as ufelefs.

ESCHEVIN, or ECHEVIN. See ECHEVIN.

ESCHRAKITES, in matters of religion, a fect of mahometans, who believe that man's fovereign good confifts in the contemplation of God. They avoid all manner of vice, and appear always in good humour, defpifing the fenfual paradife of Mahomet. The moft able preachers, in the royal mofques, are of this fect.

ESCLAIRCISSEMENT, a french term adopted into our language, fignifying the explication or clearing up of fome difficulty or obfcurity.

ESCLATTE', in heraldry, fignifies a thing forcibly broken, or rather a fhield that has been broken and fhattered with the ftroke of a battle-ax.

ESCORT, in the art of war, the fame with convoy. See the article CONVOY.

ESCROW, among lawyers, a deed delivered to a third perfon, to be the deed of the party making it upon a future condition, that when a certain thing is performed, it fhall be delivered to the party to whom it was made, to take effect as the deed of the perfon firft delivering it.

ESCUAGE, in our old cuftoms, a kind of knight-fervice, called fervice of the fhield, by which the tenant was bound to follow his lord to the wars at his own charge.

It is alfo ufed for a fum of money paid to the lord, in lieu of fuch fervice; or even for a reafonable aid, levied by the lord upon his tenants who held by the knight's fervice.

ESCULENT, an appellation given to fuch plants, or the roots of them, as may be eaten; fuch are beets, carrots, artichoaks, leeks, onions, parfneps, potatoes, radifhes, fcorzonera, *&c.* See the articles BEET, CARROT, *&c.*

ESCULUS, the HORSE-CHESNUT, a genus of trees, belonging to the heptandria-monogynia clafs of plants; its flower confifts of five roundifh petals, and the fruit is a roundifh, echinated, and coriaceous capfule, with only one cell, in which are contained two roundifh feeds, tho' fometimes only one.

ESCURIAL, a palace of the king of Spain, twenty-one miles north-weſt of Madrid; being one of the largeſt and moſt beautiful in the world. It has eleven thouſand windows, fourteen thouſand doors, one thouſand eight hundred pillars, ſeventeen cloyſters or piazzas, and twenty-two courts; with every convenience and ornament that can render a place agreeable in ſo hot a climate, as an extenſive park, groves, fountains, caſcades, grottos, *&c.*

ESCUTCHEON, or SCUTCHEON, in heraldry, is derived from the french *eſcuſſon*, and that from the latin *ſcutum*, and ſignifies the ſhield whereon coats of arms are repreſented.

Moſt nations, of the remoteſt antiquity, were wont to have their ſhields diſtinguiſhed by certain marks painted on them; and to have ſuch on their ſhields was a token of honour, none being permitted to have them till they had performed ſome honourable action.

The eſcutcheon, as uſed at preſent, is ſquare, only rounded off at the bottom.

As to the bearings on ſhields, they might at firſt be arbitrary, according to the fancy of the bearer; but, in proceſs of time, they came to be the gift of kings and generals, as the reward of honourable actions.

ESCUTCHEON *of pretence*, that on which a man carries his wife's coat of arms; being an heireſs, and having iſſue by her. It is placed over the coat of the huſband, who thereby ſhews forth his pretenſions to her lands. See the article HEIRESS.

Points of an ESCUTCHEON. See POINT.

Quartering of an ESCUTCHEON. See the the article QUARTERING.

ESDRAS, the name of two apocryphal books, uſually bound up with the ſcriptures. They were always excluded the jewiſh canon, and are too abſurd to be admitted as canonical by the papiſts themſelves. The firſt book is chiefly hiſtorical, giving an account of the return of the Jews from the babyloniſh captivity, and the building of the ſecond temple; the ſecond is written in the prophetical way, pretending to viſions and revelations, but ſuch as are extremely ridiculous.

ESK, a river which forms part of the boundary between England and Scotland; and, running from north-eaſt to ſouth-weſt, falls into the Solway-frith: it gives name to the country of Eſkdale.

ESKIMAUX, ſometimes called New Britain, and Terra de Labrador, is an extenſive country of North America, ſituated between 59° and 80° weſt long. and between 50° and 64° north lat.

It is bounded by Hudſon's ſtraits, which ſeparate it from Greenland, on the north; by the Atlantic ocean, on the eaſt; by the river and bay of St. Lawrence, on the ſouth-eaſt; and by Hudſon's bay, on the weſt.

ESLINGEN, an imperial city of Swabia, in Germany, ſeven miles ſouth-eaſt of Stutgard.

ESLIRASS, in law, perſons particularly appointed or choſen to impannel juries.

ESNECY, in law, a private prerogative, allowed to the eldeſt coparcener, where an eſtate is deſcended to daughters for want of an heir male, to chooſe firſt, after the eſtate of inheritance is divided.

It has been alſo extended to the eldeſt ſon and his iſſue, holding firſt, this right being *jus primogenituræ.*

ESOX, in ichthyology, a genus of malacopterygious fiſhes, wherein the membrane of the gills contains from twelve to fourteen oſſicles or little bones, and there is a fin on the back very near the tail.

To this genus belong the lucius or pike, the acus or needle-fiſh, and the greateſt ſquamoſe acus. See LUCIUS and ACUS.

ESPALIERS, in gardening, are rows of trees planted about a whole garden or plantation, or in hedges, ſo as to incloſe quarters or ſeparate parts of a garden; and are trained up regularly to a lattice of wood-work in a cloſe hedge, for the defence of tender plants againſt the injuries of wind and weather. They are of admirable uſe and beauty in a kitchen-garden, ſerving not only to ſhelter the tender plants, but ſcreen them from the ſight of perſons in the walks.

The trees chiefly planted for eſpaliers, are apples, pears, and ſome plums: ſome plant apples grafted upon paradiſe-ſtocks; but, as theſe are of ſhort duration, it is better to plant thoſe grafted upon crab-ſtocks, or upon what the gardeners call dutch-ſtocks; which will both cauſe them to bear ſooner, and prevent their growing too luxuriant. The beſt kind of apples for this purpoſe, are the golden pippen, nonpareil, rennete, *&c.* and the beſt ſort of pear, are the jargonelle, blanquette, *&c.* Theſe laſt, if deſigned for a ſtrong moiſt ſoil, ſhould be grafted upon quince-ſtocks; but, if for a dry ſoil, upon free-ſtocks.

While the trees are young, it will be ſufficient to drive a few ſtakes into the ground

ground on each side of them; fastening the branches to these in an horizontal position, as they are produced. This method will do for the three first years; after which an espalier should be made of ash-poles, whereof there must be two sorts, larger and smaller; the former to be driven upright into the ground a foot asunder, and the latter, or slender poles, to be nailed across these, at about nine inches. Some prefer to this another sort of espalier, made of square timber cut to any size; these are, indeed, more sightly, but withal vastly more expensive.

When the espalier is thus framed, the branches are to be fastened to it with osier-twigs; observing to train them in an horizontal position, and at equal distances. Fruit trees thus managed, are preferable to any others; not only as bearing better tasted fruit, but as taking up very little room in a garden, so as to be less hurtful to plants which grow in the quarters.

ESPAULE and ESPAULEMENT. See the articles EPAULE and EPAULEMENT.

ESPERIE, a city of Hungary, forty miles north of Tockay; it is remarkable for its salt mines.

ESPLANADE, in fortification, the sloping of the parapet of the covered way towards the campaign. See PARAPET and CAMPAIGN.

It is the same with glacis, but begins to be antiquated, and is more properly the empty space betwixt a citadel and the houses of a town, commonly called a place of arms. See FORTIFICATION, COVERT-WAY, GLACIS, and CITADEL.

ESPLEES, in law, the general products which lands yield, or the profit or commodity that is to be taken or made of a thing; as of a common, the taking of grass by the mouths of the beasts that common there; of an advowson, taking of tythes by the parson; of wood, the felling of wood; of an orchard, felling the fruit growing there; of a mill, the taking of toll, *&c.*

These and such-like issues are termed esplees. In a writ of right of land, advowson, *&c.* the demandant must allege in his count, that he or his anceftors took the esplees of the thing demanded, otherwise the pleading is not good.

ESPOUSALS, in law, signify a contract or promise made between a man and a woman, to marry each other; and in cases where marriage may be consummated, espousals go before. Marriage is termed an espousal *de præsenti.*

ESQUINANCY, in medicine. See the article QUINZY.

ESQUIRE, *armiger*, was antiently the person that attended a knight in the time of war, and carried his shield.

This title has not, for a long time, had any relation to the office of the person, as to carry arms, *&c.* Those to whom the title of esquire is now of right due, are all noblemens younger sons, and the eldest sons of such younger sons; the eldest sons of knights, and their eldest sons; the officers of the king's courts, and of his houshold; counsellors at law, justices of the peace, *&c.* though those latter are only esquires in reputation: besides, a justice of the peace holds this title no longer than he is in commission, in case he is not otherwise qualified to bear it; but a sheriff of a county, who is a superior officer, retains the title of esquire during life, in consequence of the trust once reposed in him; the heads of some antient families are said to be esquires by prescription.

ESQUIRES *of the king*, are such as have that title by creation, wherein there is some formality used, as the putting about their necks a collar of SS, and bestowing on them a pair of silver-spurs, *&c.*

There are four esquires of the body to attend the king's person.

If an esquire be arraigned of high treason, he ought to be tried by a jury each whereof have 40 s. of freehold, and 100 l. in goods; and a knight has no other privilege. The heir-apparent of an esquire, is privileged to keep grey-hounds, setting-dogs, or nets to take partridges and pheasants, though he cannot dispend 10 l. of estate of inheritance, or the value of 30 l. of estate for life.

ESSART, or ASSART, in law. See the article ASSART.

ESSAY, a trial or experiment for proving the quality of any thing; or an attempt to learn, whether or no any invention will succeed.

ESSAY, in metalurgy. See ASSAY.

ESSAY, in literature, a peculiar kind of composition, the character whereof is to be free, easy, and natural; not tied to strict order or method, nor worked up and finished like a formal system.

An essay chiefly consists in occasional reflections, leaving the subject and then returning to it again, as the thoughts happen to occur to the mind. Montaign is said to have excelled in this species of writing; and the great lord Bacon is also a pattern

a pattern in this way. Mr. Locke calls his treatiſe on the human underſtanding, an Eſſay; and Mr. Pope calls his four ethic epiſtles, an Eſſay on Man.

ESSAY-HATCH is the miner's term for a little trench or hole, which they dig to ſearch for ſhoad or ore.

ESSE, in the ſchools, the ſame with eſſence. See the article ESSENCE.

ESSECK, a town of Hungary, near the confluence of the rivers Drave and Danube, with a bridge five miles over; it lies about eighty miles north-weſt of Belgrade.

ESSENCE, in philoſophy, that which conſtitutes the particular nature of each genus or kind, and diſtinguiſhes it from all others; being nothing but that abſtract idea to which this name is affixed; ſo that every thing contained in it, is eſſential to that particular kind.

This Mr. Locke calls the nominal eſſence, in contradiſtinction to the real eſſence, or conſtitution of ſubſtances, on which this nominal eſſence depends; thus the nominal eſſence of gold, is that complex idea the word gold ſtands for; let it be, for inſtance, a body, yellow, weighty, malleable, fuſible, and fixed; but its real eſſence is the conſtitution of its inſenſible parts, on which thoſe qualities and all its other properties depend, which is wholly unknown to us.

That eſſence, in the ordinary uſe of the word, relates to ſorts, appears from hence, that, if you take away the abſtract ideas by which we ſort individuals, and rank them under common names, then the thought of any thing eſſential to any of them inſtantly vaniſhes. We have no notion of the one without the other, which plainly ſhews their relation. No property is thought eſſential to any individual whatſoever, till the mind refers it to ſome ſort or ſpecies of things; and then preſently, according to the abſtract idea of that ſort, ſomething is found eſſential; ſo that eſſential, or not eſſential, relates only to our abſtract ideas, and the names annexed to them.

Subſtances are diſtinguiſhed into ſorts and ſpecies, by their nominal eſſence; and the ſpecies of things are nothing to us, but the ranking them under diſtinct names, according to the complex ideas in us, and not according to preciſe diſtinct real eſſences in them.

We cannot rank and ſort things by their real eſſences, becauſe we know them not. Our faculties carry us no farther in the knowledge of ſubſtances, than a collection of thoſe ſenſible ideas we obſerve in them. But the internal conſtitution whereon theſe eſſences depend, is utterly unknown to us. This is evident when we come to examine but the ſtones we tread on, or the iron we daily handle; we ſoon find that we know not their make, and can give no reaſon of the different qualities we find in them; and yet how infinitely theſe come ſhort of the fine contrivance, and unconceivable real eſſences of plants and animals, every one knows.

But though the nominal eſſences of ſubſtances are made by the mind, they are not yet made ſo arbitrarily as thoſe of mixed modes. To the making of any nominal eſſence, it is neceſſary, 1. That the ideas whereof it conſiſts, have ſuch an union as to make but one idea, how compounded ſoever. 2. That the particular idea ſo united be exactly the ſame, neither more nor leſs: for if two abſtract complex ideas differ, either in number or ſorts of their component parts, they make two different, and not one and the ſame eſſence. In the firſt of theſe, the mind, in making its complex ideas of ſubſtances, only follows nature, and puts none together which are not ſuppoſed to have an union in nature; for men obſerving certain qualities always joined and exiſting together, therein copy nature, and of ideas ſo united make their complex ones of ſubſtances.

Though the nominal eſſences of ſubſtances are all ſuppoſed to be copied from nature, yet they are all, or moſt of them, very imperfect: and ſince the compoſition of theſe complex ideas is in ſeveral men very different, we may conclude that theſe boundaries of ſpecies are in men and not as nature makes them; if, at leaſt, there are in nature any ſuch prefixed bounds. If the firſt ſorting of individuals depends upon the mind of man, variouſly collecting the ſimple ideas that make the nominal eſſence of the loweſt ſpecies, it is much more evident that the more comprehenſive claſſes called genera, do ſo in forming more general ideas that may comprehend different ſorts: the mind leaves out thoſe qualities that diſtinguiſh them, and puts into its new collection only ſuch ideas as are common to ſeveral ſorts: thus by leaving out thoſe qualities that are peculiar to gold, ſilver, &c. and by retaining a complex idea made up of thoſe that are common to each ſpecies,

cies, there is a new genus conftituted, to which the name metal is annexed.

ESSENCE, in chemiftry, fignifies the balfamic part of any thing, feparated from the thicker matter; fo that wherever this is done by means of extraction, the balfamic part is called effence by way of eminence: fometimes thickened juices are called effences, but it is better to call thefe by their own name, to avoid confufion.

ESSENDO QUIETEM DE TOLLONIO, in law, a writ which lies for citizens, burgeffes, &c. who by charter or prefcription ought to be free from toll, in cafe the fame is exacted of them.

ESSENES, or ESSENIANS, in jewifh antiquity, one of the three antient fects among that people, who outdid the Pharifees in their moft rigorous obfervances. They allowed a future ftate, but denied a refurrection from the dead. Their way of life was very fingular: they did not marry, but adopted the children of others, whom they bred up in the inftitutions of their fect: they defpifed riches, and had all things in common; and never changed their cloaths, till they were entirely worn out. When initiated, they were ftrictly bound not to communicate the myfteries of their fect to others; and if any of their members were found guilty of enormous crimes, they were expelled.

Pliny tells us, that they dwelt on the weft fide of the lake of Afphaltites; that they were a folitary kind of men, living without women or money, and feeding upon the fruit of the palm-tree: he adds, that they were conftantly recruited by new comers, whom the furges of ill fortune had made weary of the world; in which manner the fect was kept up for feveral thoufands of years, without any being born among them. The reafon why we find no mention made of them in the New Teftament, may be their reclufe and retired way of life, no lefs than their great fimplicity and honefty, whereby they lay open to no cenfure or reproof.

ESSENTIAL, fomething neceffarily belonging to the effence or nature of a thing, from which it cannot be conceived diftinct; thus the primary qualities of bodies, as extenfion, figure, number, &c. are effential or infeparable from them in all their changes and alterations. See the article QUALITY.

ESSENTIAL OIL, that procured from plants by diftillation. See the article OIL.

ESSENTIAL SALTS, thofe obtained from vegetable juices by cryftallization. See the article SALT.

ESSEX, a county of England, bounded by Suffolk, on the north; by the German fea, on the eaft; by the river Thames, which divides it from Kent, on the fouth; and by Middlefex and Hertfordfhire, on the weft.

ESSOIN, in law, an excufe for a perfon fummoned to appear and anfwer to an action, on account of ficknefs or other juft caufe of his abfence.

It is a kind of imparlance or craving of longer time, and obtains in real, perfonal, and mixed actions.

There are divers effoins, as *de ultra mare*, when the defendant is beyond fea, whereby he is allowed forty days; in an expedition to the holy land, a year and a day; infirmity, called common effoin, when he is fick in bed; and, laftly, in the king's fervice.

ESSOIN-DAY, is regularly the firft day of every term, though the fourth day after is alfo allowed by way of indulgence.

ESSOIN *de malo villæ*, is where the defendant appears in court, but before pleading, falls fick in a certain village; this is alfo allowed, if found true.

ESSOINS and PROFFERS. See the article PROFFER.

ESSORANT, in heraldry, denotes a bird ftanding on the ground with its wings expanded, as if it had been wet, and were drying itfelf.

ESTABLISHMENT *of dower*, in law, an affurance of dower made to the wife by the hufband, or fome friend of his, on marriage. See the article DOWER.

ESTAPLES, a port-town of Picardy, in France, twelve miles fouth of Boulogne.

ESTATE, in law, fignifies the title or intereft that a perfon has in lands, tenements, or other effects; comprehending the whole in which a perfon hath any property, and will pafs the fame.

Eftates are either real or perfonal; otherwife diftinguifhed into freeholds, which defcend to heirs; or chattels, that go to executors or adminiftrators. See the article FREEHOLD, &c.

A fee fimple is the ampleft eftate our law admits of. See the article FEE.

Eftates are obtained feveral ways, as by defcent from a father to a fon; by conveyance or grant, from one perfon to another; by gift or purchafe; or by deed or will. See the articles HEIR, CONVEYANCE, GRANT, &c.

ESTATES, in a political fenfe, is ufed either

ther to denote the dominions of ſome prince, or the general claſſes into which the people are divided.

In Britain, the eſtates are the king, lords, and commons; or rather the lords and commons, who meet the king in parliament, for reforming abuſes, and enacting good and wholeſome laws. See the articles STATUTE, PARLIAMENT, *&c.*

In France, there are three eſtates, *viz.* the clergy, the nobility, and the people, who make the third eſtate.

ESTATES GENERAL, in the polity of Holland. See the article STATES.

ESTE, a town of Italy, fifteen miles ſouth-weſt of Padua, and ſubject to Venice.

ESTELLA, a town of Navarre, in Spain, twenty miles ſouth-weſt of Pampeluna.

ESTEPA, a town of Spain, in the province of Granada, forty-five miles north of Malaga.

ESTETE', in heraldry, denotes the heads of beaſts torn off by main force. See the articles ARACHE' and ERASED.

ESTHER, a canonical book of the Old Teſtament, containing the hiſtory of a jewiſh virgin, dwelling with her uncle Mordecai at Shuſhan, in the reign of Ahaſuerus, one of the kings of Perſia.

The great beauty of this maid raiſed her to the throne of Perſia, whereby ſhe had an opportunity to ſave her countrymen, whoſe deſtruction was plotted by Haman, a favourite of that prince.

The learned are not agreed who this Ahaſuerus was. Archbiſhop Uſher ſuppoſes him to be Darius Hiſtaſpes, and Artyſtona to be Eſther. Scaliger makes him the ſame with Xerxes, and his queen Hameſtris to be Eſther. Joſephus, on the contrary, poſitively aſſerts, that the Ahaſuerus of the ſcriptures, is the Artaxerxes Longimanus of profane ſtory; and the ſeptuagint, throughout the whole book of Eſther, tranſlate Ahaſuerus by Artaxerxes. Moſt people ſubſcribe to this laſt opinion; and, indeed, the extraordinary kindneſs ſhewed by Ataxerxes to the Jews, can ſcarce be accounted for otherwiſe, than by ſuppoſing that they had ſo powerful an advocate as Eſther to ſolicite for them.

ESTIVAL, or ÆSTIVAL. See the article ÆSTIVAL.

ESTOILE'E, or CROSS ESTOILE'E, in heraldry, a ſtar with only four long rays in form of a croſs; and, accordingly, broad in the center, and terminating in ſharp points.

ESTONIA, a province ſubject to Ruſſia, on the north of Livonia.

ESTOPPEL, in law, an impediment or bar to an action, which ariſes from a perſon's own fact; or rather, where he is forbid by law to ſpeak againſt his deed, which he may not do, even to plead the truth. Thus where a perſon is bound in a bond by ſuch a name, and being afterwards ſued by that name on the obligation, he ſhall not be allowed to ſay he is miſnamed, but ſhall anſwer according to the bond, though it be wrong. Hence the parties in all deeds are eſtopped from ſaying any thing againſt them. However, a plaintiff is not eſtopped from ſaying any thing againſt what he had ſaid in his writ or declaration; and though parties be eſtopped, yet juries are not ſo, who may find things out of the record.

ESTOVERS, in law, is moſt generally taken for certain allowances of wood made to tenants, as houſe-bote, hedge-bote, and plough-bote; which three are comprehended under reaſonable eſtovers.

ESTRANGEL, ESTRANGELUS CHARACTER, in the ſyriac grammar, a particular ſpecies or form of ſyriac letters, ſerving as the majuſculæ letters of that language, and by ſeveral ſuppoſed to be the true antient chaldee character.

ESTRAPADE, in the manege, the defence of a horſe that will not obey; who, to get rid of his rider, riſes mightily before; and, while his forehand is yet in the air, yerks furiouſly with his hind legs, ſtriking higher than his head was before; and during this counter-time, goes back rather than advances.

ESTRAY, in law, any beaſt not wild that is found within a lordſhip, and owned by nobody: in which caſe, being cried according to law in the two next market towns adjacent, and not claimed in a year and a day by the owner, it becomes the property of the lord of the manor, or liberty wherein it was found.

If the beaſt proclaimed ſtray to another lordſhip within the year, the firſt lord cannot retake it; and where the eſtray was never duly proclaimed, the owner may take it again, at any time, upon paying the lord for keeping thereof: likewiſe the owner may ſeize an eſtray, without telling the marks or proving his property, which may be done at the trial, if conteſted; and here the tendering of amends is good, without ſhewing any particular ſum.

ESTREAT, in law, a true copy, note, or duplicate of an original writing or record, efpecially fines, amercements, penalties, &c. fet down and impofed in the rolls of a court, to be levied by the bailiff, or other officer.

Eftreats relate generally to fines for crimes and offences, defaults and omiffions of perfons concerned in fuits, and likewife of officers. Non-appearance of defendants and jurors, &c. and before procefs iffues to levy forfeitures on recognizances to the king's ufe, the recognizances muft be firft eftreated into the exchequer by fheriffs of counties. Fines, poft fines, and forfeitures, are to be eftreated twice a year on pain of 50 l. and it is the courfe of the king's bench to fend their eftreats into the exchequer on the laft days of the two iffuable terms.

ESTREMADURA, a province of Spain, bounded by Leon, on the north; by the two Caftiles, on the eaft; by Andalufia, on the fouth; and by the province of Alentejo, in Portugal, on the weft.

ESTREMADURA is alfo a province of Portugal, lying north of Alentejo, and weftward of fpanifh Eftremadura. Lifbon is its capital, as alfo of the kingdom.

ESTREMOS, a town of Alentejo, in Portugal, eighty-five miles fouth-eaft of Lifbon.

ESTREPEMENT, in law, any fpoil made by tenants for life on any lands, &c. to the prejudice of the reverfioner: it is alfo taken to fignify the making land barren, by continual plowing and fowing, and thereby drawing out the heart of the ground without manuring, or rather good hufbandry, by which means it is impaired.

It may likewife be applied to the cutting down of trees, or lopping them farther than the law allows.

There is alfo a writ of eftrepement that lies in two cafes, *viz.* the one is where a perfon having an action depending, as a formedon or writ of right, &c. fues to prohibit the tenant from making wafte. The other is for the demandant, who is adjudged to recover feifin of the land, before execution, fued out by the writ habere facias poffeffionem, in order to prevent wafte being made before he gets into poffeffion.

ESULA, in botany, a kind of fpurge, comprehended under the euphorbia of Linnæus.

It is one of the fharpeft and moft acrid fpurges, and therefore hardly fafe: it purges violently, both by vomit and ftool. Some recommend it in dropfies, but it fhould be ufed with great caution; and it is a good method to macerate it a day or two in vinegar, before it is ufed.

ESURINE SALTS, fuch as are of a corroding, fretting, and eating nature; abounding chiefly in places near the fea-fide, and where great quantities of coals are burnt, as appears from the fpeedy rufting of iron bars in windows of houfes built in fuch places.

ESWEGEN, or ESCHWEGE, a town of Germany, twenty-five miles fouth-eaft of the city of Caffel.

ETAPPE, a term ufed, in the french armies, for the provifions and forrage allowed an army in their rout through a kingdom, whether going into winter-quarters, or returning to take the field. Hence, etapier is the undertaker or perfon who contracts with the country or territory, for furnifhing the faid provifions.

ETCHING, a method of engraving on copper, in which the lines or ftrokes, inftead of being cut with a tool or graver, are eaten in with aquafortis.

Etching is done with more eafe and expedition than engraving: it requires fewer inftruments, and reprefents moft kind of fubjects better and more agreeable to nature, as landfcapes, ruins, grounds, and all fmall, faint, loofe, remote objects, buildings, &c. See ENGRAVING.

The method of etching is as follows: choofe the copper-plate as directed for engraving, and furnifh yourfelf with a piece of ground, tied up in a bit of thin filk, kept very clean, to be laid upon the plate when both have been warmed; proper needles to hatch with on the ground; a pencil or brufh, to wipe away the bits of ground which rife after hatching; a polifher; two or three gravers; a pair of compaffes, to meafure diftances and draw circles; a ruler, to hatch ftraight lines; green wax, to make the wall round the edges of the plate, to contain the aquafortis; an oil-ftone; a bottle of aquafortis; fome red lead, to colour the backfide of the copy; a ftift and a hand-vice, to hold the plate over the candle. See the articles NEEDLE, GRAVER, POLISHER, COMPASS, &c.

To make the ground, take three ounces of afphaltum, two ounces of clean rofin, half an ounce of burgundy-pitch, three ounces of black wax, and three ounces of virgin's wax: let all thefe be

melted

melted in a clean earthen pipkin over a flow fire, ftirring it all the time with a fmall ftick; if it burn to the bottom, it is fpoiled. After the ingredients are well melted, and it boils up, put it into a pan of fair water; and before it be quite cold, take it out, and roll it into fmall lumps to be kept from duft: this ground is what others call the varnifh. The next thing is to clean the plate to receive the ground: take a piece of lifting, roll it up as big as an egg, tie it very tight, fo as to make it a rubber, and having dropped a fmall quantity of fweet oil, and added a little powder of rotten-ftone on the plate, rub it with this ball, till it will almoft fhew your face. Then wipe it all off with a clean rag, and after that, make it quite dry with another clean rag, and a little fine whiting.

The next thing is to lay on the varnifh; to do which aright you muft take a hand-vice, and fix it at the middle of one part of the plate, with a piece of paper between the teeth of the hand-vice and the plate, to prevent the marks of the teeth: then laying the plate on a chaffing-difh, with a fmall charcoal fire in it, till the plate be fo hot, that, by fpitting on the backfide, the wet will fly off: rub the plate with the ground tied up in filk, till it be covered all over; and after that dawb the plate with a piece of cotton wrapped up in filk till the ground be quite fmooth, keeping the plate a little warm all the time. The varnifh being thus fmoothed upon the plate, it muft be blacked in the following manner: Take a thick tallow candle that burns clear, with a fhort fnuff, and having driven two nails into the wall, to let it reft upon, place the plate againft the wall with the varnifh fide downward, and take care not to touch the ground with your fingers: then taking the candle, apply the flame to the varnifh as clofe as poffible, without touching the varnifh with the fnuff of the candle, and guide the flame all over it, till it become perfectly black. After this is done, and the plate dry, the defign is traced with a needle through the varnifh, and a rim or border of wax is raifed round the circumference of the plate; and then the artift has a compofition of common varnifh and lamp-black, made very thin, wherewith he covers the parts that are not to be bitten, by means of a hair pencil. And he is every now and then covering or uncovering this or that part of the defign, as occafion may require; the conduct of the aquafortis being the principal concern, on which the effect of the print very much depends. The operator muft be attentive to the ground, that it does not fail in any part, and where it does, to ftop up the place with the above compofition. The plate is defended from the aquafortis every where, but in the lines or hatches cut through it with the needle, through which the water eats into the copper to the depth required; remembering to keep it ftirring with a feather all the while, which done, it is to be poured off again.

Single aquafortis is moft commonly ufed; and if it be too ftrong, mix it with vinegar, otherwife it will make the work very hard, and fometimes break up the ground: the aquafortis having done its part, the ground is taken off, and the plate wafhed and dried: after which nothing remains for the artift but to examine the work with his graver, to touch it up, and heighten it where the aquafortis has miffed.

And, laftly, it is to be remembered, that a frefh dip of aquafortis is never given, without firft wafhing out the plate in fair water, and drying it at the fire.

ETERNITY, an attribute of God, expreffing his infinite or endlefs duration. See the article GOD.

According to Mr. Locke, we come by the idea of eternity, by being able to repeat any part of time, as a year, as often as we will, without ever coming to an end.

ETHELING, or ATHELING. See the article ATHELING.

ETHER and ETHERIAL. See the articles ÆTHER and ÆTHERIAL.

ETHICS, or MORALITY, the fcience of manners or duty, which it traces from man's nature and condition, and fhews to terminate in his happinefs; or, in other words, it is the knowledge of our duty and felicity, or the art of being virtuous and happy.

Moral philofophy inquires, not how man might have been, but how he is conftituted; not into what principles or difpofitions his actions may be artfully refolved, but from what principles and difpofitions they actually flow; not what he may, by education, habit, or foreign influence, come to be or do, but what by his nature, or original frame, he is framed to be and do. From a view, therefore, of man's faculties, appetites and paffions, it appears, that the health and perfection

of man muſt be in the ſupremacy of conſcience and reaſon, and in the ſubordination of the paſſions and affections to their authority and direction; and his virtue or goodneſs muſt conſiſt in acting agreeably to this order and oeconomy.

It is true, ſome eminent philoſophers have attempted to lay the foundation of morals much deeper, and on a more large and firm bottom, *viz.* the natures and reaſons, the truth and fitneſſes of things. Senſes and affections, they tell us, are vague and precarious; and though they were not, yet irrational principles of action, and conſequently very improper foundations, on which to reſt the eternal and immutable obligations of morality. Hence they talk much of the abſtract natures and reaſons of things, of eternal differences, unalterable relations, fitneſſes and unfitneſſes reſulting from thoſe relations; and from theſe eternal reaſons, differences, relations, and their conſequent fitneſſes, they ſuppoſe moral obligation to ariſe. A conduct agreeable to them, or, in other words, to truth, they call virtue; and the reverſe, vice.

But the truth is, that we might perceive all the poſſible relations, differences, and reaſons of things, and yet be wholly indifferent to this or that conduct, unleſs we were endued with ſome ſenſe or affection, by which we approved and loved the one, and diſapproved and diſliked the other conduct. Reaſon may perceive a fitneſs to a certain end, but without ſome ſenſe or affection we cannot propoſe, or indeed have any idea of an end; and, without an end, we cannot conceive any inducement to action. Therefore, before we can underſtand the natures, reaſons, and fitneſſes of things, which are ſaid to be the foundation of morals, we muſt know what natures are meant, to what ends they are fitted, and from what principles or affections they are prompted to act; otherwiſe we cannot judge of the duty required, or of the conduct becoming that being whom we ſuppoſe under moral obligation. But let the natures be once given, and the relations which ſubſiſt among them be aſcertained, we can then determine what conduct will be obligatory to ſuch natures, and adapted to their condition and œconomy. And to the ſame natures, placed in the ſame relations, the ſame conduct will be eternally and invariably proper and obligatory.

Beſides, to call morality a conformity to truth, gives no idea, no characteriſtic of it, but what ſeems equally applicable to vice. For whatever propoſitions are predicable of virtue, as, that it flows from good affections, or is agreeable to the order of our nature, tends to produce happineſs, is beheld with approbation, and the like; the contrary propoſitions are equally true, and may be equally predicated of vice.

Another ſet of philoſophers eſtabliſh morals upon the will or poſitive appointment of the Deity, and call virtue a conformity to that will, or appointment. All obligation, they ſay, ſuppoſes one who obliges, or who has a right to preſcribe, and can reward the obedient, and puniſh the diſobedient. This can be none but the Creator. His will, therefore, is our law, which we are bound to obey. And this, they tell us, is only ſufficient to bind or oblige ſuch imperfect and corrupt creatures as we are, who are but feebly moved with a ſenſe of the beauty and excellency of virtue, and ſtrongly ſwayed by paſſion, or views of intereſt.

This ſcheme of morality entirely coincides with that deduced from our inward ſtructure and condition, ſince theſe are the effects of the divine will. Whatever therefore is agreeable, or correſpondent to our inward ſtructure, muſt likewiſe be agreeable, or correſpond to the will of God. So that all the indications, or ſanctions of our duty, which are declared or enforced by our ſtructure, are, and may be, conſidered as indications or ſanctions of the will of our Creator. If theſe indications, thro' inattention to, or abuſe of our ſtructure, prove inſufficient to declare; or if theſe ſanctions, through the weakneſs or wickedneſs of men, prove inſufficient to enforce obedience to the divine will, and the Deity is pleaſed to add new indications, or new ſanctions; theſe additional indications and ſanctions cannot, and are not ſuppoſed, by the aſſertors of this ſcheme, to add any new duty, or new moral obligation; but only a new and purer promulgation of our duty, or a new and ſtronger ſanction or motive from intereſt, to perform that duty, and to fulfil that obligation to which we were bound before. It makes no difference, as to the matter of obligation, after what manner the will of our Creator is enforced, or declared to us, whether by word or writ, or by certain inward notices and determinations of our

our own minds, arifing according to a neceffary law of our nature. Again, if the fcheme of duty, as deduced from moral perceptions, and the affections of our nature, be thought too flight a foundation on which to reft morality, becaufe thefe are found infufficient to bind, or rather to compel men to their duty, we fear the fame objection will militate againft the fcheme of conformity to the divine will, fince all the declarations and fanctions thereof have not hitherto had their due effect, in producing a thorough and univerfal reformation.

When fome fpeak of the will of God, as the rule of duty, they do not certainly mean a blind, arbitrary principle of action, but fuch a principle as is directed by reafon, and governed by wifdom, or a regard to certain ends in preference to others: for unlefs we fuppofe fome principle in the Deity analogous to our fenfe of obligation, fome antecedent affection, or determination of his nature, to prefer fome ends before others, we cannot affign any fufficient reafon why he fhould will one thing more than another, or have any election at all. Whatever therefore is the ground of his choice, or will, muft be the ground of obligation, and not the choice or will itfelf. That this is the cafe, appears farther from the common diftinction which divines and philofophers make between moral and pofitive commands and duties. The former they think obligatory antecedent to will, or at leaft to any declaration of it; the latter, obligatory only in confequence of a pofitive appointment of the divine will. But what foundation can there be for this diftinction, if all duty and obligation be equally the refult of mere will?

Before we conclude this article, it will be proper to fay fomething of the extraordinary hypothefis of Hobbes, concerning the foundation of morality. This philofopher, who faw his country involved in all the diftraction and mifery of a civil war, feems to have taken too narrow and partial a view of our nature, and has therefore drawn it in a very odious and uncomfortable light. Next to the defire of felf-prefervation, he makes the love of glory and of power to be the governing paffions in man; and from thefe, by an arbitrary, unnatural, and unfupported hypothefis, contrary to common experience, and common language, he attempts to deduce all the other paffions which inflame the minds, and influence the manners of men. According to him, all men are equal, all defire and have a right to the fame things, and want to excel each other in power and honour; but as it is impoffible for all to poffefs the fame things, or to obtain a preheminence in power and honour, hence muft arife a ftate of war and mutual carnage; which is what he calls a ftate of nature. But this fhrewd philofopher fubjoins, that men being aware that fuch a ftate muft terminate in their own deftruction, agreed to furrender their private unlimited right into the hands of the majority, or fuch as the majority fhould appoint, and to fubject themfelves for the future to common laws, or to common judges or magiftrates. In confequence of this furrender, and of this mutual compact or agreement, they are fecured againft mutual hoftilities, and bound or obliged to a peaceable behaviour: fo that it is no longer lawful or juft (he certainly means fafe or prudent) to invade and incroach on one another, fince this would be a violation of his promife. But one may afk him, what obligation is a man under to keep his promife, or ftand to his compact, if there be no obligation, no moral tie diftinct from that promife? On the whole, his ftate of nature is a mere chimera, and the fuperftructure he has raifed on it no lefs fo.

ETHIOPIA, or ÆTHIOPIA, a very extenfive country of Africa, comprehending Abyffinia, Nubia, and Abex: it is bounded by Egypt, and the defart of Barca on the north, by the Red fea, and Indian Ocean on the eaft, by Anian, and the unknown parts of Africa on the fouth, and by other unknown countries on the weft. See ABEX and NUBIA.

ETHIOPIC YEAR. See the article YEAR.

ETHMOIDAL, in anatomy, one of the common futures of the fkull, which goes round the os ethmoides, from which it derives its name, feparating it from the bone in contact with it.

ETHMOIDES OS, in anatomy, the fame with cribrofum os, or cubiforme. See the article CRIBROSUM.

ETHNARCH, *etchnarcha*. See the article ÆCHMALOTARCHA.

ETHNOPHRONES, in church-hiftory, heretics of the feventh century, who, profeffing chriftianity, joined thereto all the ceremonies and follies of paganifm, fuch

ſuch as judicial aſtrology, divinations of all kinds, &c. and who obſerved all the feaſts, times, and ſeaſons of the Gentiles.

ETHOPOEIA, or ETHOLOGY, in rhetoric, a draught, or deſcription, expreſſing the manners, paſſions, genius, tempers, aims, &c. of any perſon. Such is that noted picture of Cataline, as drawn by Salluſt: *fuit magna vi & animi*, &c. "he was a man of great vigour both "of body and mind; but of of a diſ- "poſition extremely profligate and de- "praved. From his youth he took "pleaſure in civil wars, maſſacres, "depredations, and inteſtine broils; "and in theſe he employed his younger "days. His body was formed for en- "during cold, hunger, and want of "reſt, to a degree indeed incredible: "his ſpirit was daring, ſubtle, and "changeable: he was expert in all the "arts of ſimulation and diſſimulation, "covetous of what belonged to others, "laviſh of his own, violent in his paſ- "ſions: he had eloquence enough, but "a ſmall ſhare of wiſdom: his bound- "leſs ſoul was conſtantly engaged in "extravagant and romantic projects, "too high to be attempted."

ETHUSA, FOOL'S PARSLEY, in botany, a genus of the pentandria-digynia claſs of plants, the general corolla of which is commonly uniform; the partial one conſiſts of five inflexo-cordated, unequal petals: the fruit is naked, of a roundiſh oval figure, and ſeparable in two parts: the ſeeds are two, roundiſh, ſtriated, and thence a third part plane.

ETNA, or mount GIBELLO, a vulcano, or burning mountain of Sicily, ſituated fifty miles ſouth-weſt of Meſſina, and twenty weſt of Catania. See VULCANO.

ETYMOLOGY, that part of grammar which conſiders and explains the origin and derivation of words, in order to arrive at their firſt and primary ſignification, whence Quintilian calls it *originatio*.

A judicious enquiry into etymologies, is thought by ſome of conſiderable uſe; becauſe nations, who value themſelves upon their antiquity, have always looked on the antiquity of their language as one of the beſt titles they could plead; and the etymologiſt, by ſeeking the true and original reaſon of the notions and ideas affixed to each word and expreſſion, may often furniſh an argument of antiquity, from the traces remaining thereof, compared with the antient uſes. Then that etymologies are neceſſary for the thorough underſtanding of a language.

It is objected, however, that the art is arbitrary, and built altogether on conjectures and appearances; and the etymologiſts are charged with deriving their words from where they pleaſe; and indeed it is no eaſy matter to go back into the antient britiſh and gauliſh ages, and to follow, as it were, by the track, the various imperceptible alterations a language has undergone from age to age; and as thoſe alterations have ſometimes been merely owing to caprice, it is eaſy to take a mere imagination or conjecture for a regular analogy: ſo that it is no wonder the public ſhould be prejudiced againſt a ſcience, which ſeems to ſtand on ſo precarious a footing. It muſt certainly be owned, that etymologies are frequently ſo far fetched, that one can ſcarce ſee any reſemblance or correſpondence therein. Quintilian has ſhewn, that the antient etymologiſts, notwithſtanding all their learning, fell into very ridiculous derivations.

The etymologies of our engliſh words has been derived from the Saxon, Welch, Walloon, Daniſh, Latin, Greek, &c. See the article ENGLISH.

EU, a port town of Normandy, in France, fifteen miles north-eaſt of Dieppe.

EVACUANTS, in pharmacy, are properly ſuch medicines as diminiſh the animal fluids, by throwing out ſome morbid or redundant humour, or ſuch as thin, attenuate, and promote the motion and circulation thereof. See the article ATTENUANTS, &c.

Evacuating medicines are prejudicial in intermitting fevers; they are prejudicial as they weaken, exhauſt the moſt fluid juices, and diſturb the concoctions and digeſtions which are here more eſpecially neceſſary.

EVACUATION, in medicine, the art of diminiſhing, emptying, or attenuating the humours of the body.

Evacuations are, by Dr. Pringle, much recommended in the bilious fever and dyſentery: but this ſort of medicine is to be ſparingly uſed in malignant fevers: in wounds of the head the beſt evacuations are plentiful bleeding and purging of the bowels; both which are to be made at one and the ſame time, as plentifully as the patient's ſtrength will permit;

permit; and to be repeated again as often as neceſſary, if you find the ſymptoms relieved after their adminiſtration.

Evacuations are bad in nauſeas, from a diſturbance of the ſpirits; but are of great uſe in curing the delirium in fevers: the provoking the menſes in women, is to be attempted by ſuch remedies as mollify and relax, and not by thoſe called emmenagoges, moſt of which increaſe the impetus of the circulation, except in women of a cold and lax habit: blood-letting likewiſe ſupplies the deficiency of the piles, or menſtrual diſcharge in men, by making this artificial evacuation of blood in a part the moſt remote from the head. But all theſe evacuations are only of uſe where the veſſels are diſtended with too great a quantity of blood, or when the force of the circulation is too great. In intermitting fevers evacuations are very imprudent. In inflammatory diſorders, where the chief intention ſhould alſo be to diminiſh the force of the blood, to thin it, and to relax the fibres, evacuations, ſuch as bleeding, purging, vomiting, attenuants, and diaphoretics, are the chief remedies.

EVANGELIST, a general name given to thoſe who write, or preach the goſpel of Jeſus Chriſt.

The word is of greek origin, ſignifying one who publiſhes glad tidings, or is the meſſenger of good news.

According to Hooker, evangeliſts were preſbyters of principal ſufficiency, whom the apoſtle ſent abroad, and uſed as agents in eccleſiaſtical affairs, whereſoever they ſaw need.

The term evangeliſt, however, is at preſent confined to the writers of the four goſpels. See the article GOSPEL.

EVANID, a name given by ſome authors to ſuch colours as are of no long duration, as thoſe in the rainbow, in clouds before and after ſun-ſet, *&c.*

Evanid colours are alſo called fantaſtical and emphatical colours.

EVANTES, in antiquity, the prieſteſſes of Bacchus, thus called, by reaſon, that in celebrating the orgia, they ran about as if diſtracted, crying, *evan, evan, ohé evan.* See BACCHANALIA.

EVAPORATION, in chemiſtry, the ſetting a liquor in a gentle heat to diſcharge its ſuperfluous humidity, reduce it to a proper conſiſtence, or obtain its dry remainder.

Evaporation may be accounted for from hence, that when the particles are ſo far ſeparated by heat, as to be without each others attraction, they then begin to repeal each other, and thus will ſeem to riſe from the ſurface of the fluid in the form of a vapour, or body of particles, which are at equal diſtances from each other; and becoming thus ſpecifically lighter than the ſame bulk of airy particles, they will riſe in the fluid body of the air, where they form clouds, meteors, *&c.* See CLOUD, METEOR, *&c.*

EVASION, among lawyers, denotes a cunning or ſubtile endeavouring to ſet aſide, or eſcape the puniſhment of the law; as where one ſays to another, that he will not ſtrike him, but he will give him a ſhilling to ſtrike firſt: in ſuch a caſe, if the perſon who gives the firſt ſtroke be killed, it is murder, for no perſon ſhall evade the juſtice of the law, by any ſuch pretence to ſcreen his malice.

EVATES, a branch or diviſion of the druids, or antient celtic philoſophers. Strabo divides the britiſh and gauliſh philoſophers into three ſects, bards, Βαρδοι, evates, Ουατεις, and druids, Δρυιδαι. He adds, that the bards were the poets and muſicians; the evates the prieſts and naturaliſts; and the druids were moraliſts as well as naturaliſts: but Marcellus and Hornius reduce them all to two ſects, *viz.* the bards and druids.

EUBAGES, an order of prieſts, or philoſophers, among the antient Celtæ, or Gauls: ſome will have the eubages to be the ſame with the druids, and ſaronidæ of Diodorus; and others that they were the ſame with what Strabo calls evates.

EUCHARIST, ευχαριςια, the ſacrament of the Lord's ſupper, properly ſignifies giving of thanks.

This ſacrament was inſtituted by Chriſt himſelf, and the participation of it called communion. See COMMUNION.

As to the manner of celebrating the euchariſt, among the antient Chriſtians, after the cuſtomary oblations were made, the deacon brought water to the biſhop and preſbyters, ſtanding round the table, to waſh their hands, according to that of the pſalmiſt, "I will waſh my hands "in innocency, and ſo will I compaſs "thy altar, O Lord." Then the deacon cried out aloud, "Mutually embrace "and kiſs each other;" which being done, the whole congregation prayed for the univerſal peace and welfare of the church, for the tranquillity and repoſe of the world, for the proſperity of the age, for wholſome weather, and for all ranks

and degrees of men. After this followed mutual falutations of the minifter and people; and then the bifhop, or prefbyter, having fanctified the elements, by a folemn benediction, he brake the bread, and delivered it to the deacon, who diftributed it to the communicants; and after that the cup. Their facramental wine was ufually diluted, or mixed with water. During the time of adminiftration, they fang hymns and pfalms, and having concluded with prayer and thankfgiving, the people faluted each other with a kifs of peace, and fo the affembly broke up.

EUCHOLOGIUM, ευχολογιον, in the greek church, the ritual, or book of common-prayer of that church. See RITUAL.

EUDISTS, a congregation of miffionary priefts, in France, affociated under the name and title of Jefus and Mary. It is governed by a fuperior, who receives his power from the bifhops of each diocefe, where they have an eftablifhment.

EVE, the fame with vigil. See VIGILS.

EVE'CTION, or LIBRATION, *of the moon*, in aftronomy, is an inequality in her motion, by which, at or near the quadratures, fhe is not in a line drawn through the center of the earth to the fun, as fhe is at the fyzygies, or conjunction and oppofition, but makes an angle with that line of about 2 degrees 51 min. The motion of the moon about its axis is alone equable, performing its revolution exactly in the fame time as it rolls round the earth; and thence it is that it nearly always turns the fame face towards us. But this equality, and the unequal motion of the moon in her ellipfis, is the caufe why the moon, feen from the earth, appears to librate a little upon its axis, fometimes from eaft to weft, and fometimes from weft to eaft; and fome parts in the eaftern limb of the moon go backwards and forwards a fmall fpace, and fome that were confpicuous, are hid, and then again appear.

EVEN NUMBER, in arithmetic, that which can be divided into two equal parts: fuch are 4, 10, 40, &c.

A number is faid to be evenly even, when being even itfelf, it is meafured by an even one, an even number of times: fuch is 32, as being meafured by the even number 8, an even number of times 4. Evenly odd number is, that which an even number doth meafure by an odd one: fuch is 30, which 2 or 6, both even numbers, do meafure by 15 or 5, odd ones.

EVERARD's SLIDING-RULE. See the article RULE.

EVERDING, a town of Auftria, in Germany, fituated on the Danube, twelve miles weft of Lints.

EVER-GREEN, in gardening, a fpecies of perennials, which continue their verdure, leaves, &c. all the year: fuch are hollies, phillyria's, lauruftinus's, bays, pines, firs, cedars of Lebanon, &c.

EVERLASTING-FLOWER, in botany, a name given to the amaranthoides.

EVERLASTING-PEA, a genus of plants, otherwife called lathyrus.

EVESDROPPERS, in law, perfons who ftand under the eves, walls, or windows of a houfe, by day or by night, to liften after news, and carry it to others, thereby raifing ftrife and contention in the neighbourhood. They are punifhable in the court-leet, or quarter-feffions.

EVESHAM, a borough-town thirteen miles fouth-eaft of Worcefter, which fends two members to parliament.

EUGENIA, the SILVER-TREE, in botany, a genus of the icofandria-monogynia clafs of plants, the corolla whereof confifts of four oblong, obtufe, concave petals, twice as large as the cup: the fruit is a quadrangular, coronated drupe, containing only one cell: the feed is a roundifh, fmooth nut.

EUGUBIO, a town and bifhop's fee of Italty, in the dutchy of Urbino, and thirty-five miles fouth of that city.

EVIAN, a town of Savoy, fituated twenty-five miles north-eaft of Geneva, on the fouth fide of the lake of Geneva.

EVICTION, in law, fignifies a recovery of lands, or tenements by law.

When lands, &c. are evicted before rent referved upon a leafe becomes due, the leffee is not liable to pay any rent. Likewife, if on an exchange of lands, either of the parties is evicted of the land given in exchange, the party evicted may, in that cafe, re-enter his own lands. And a widow being evicted of her thirds, fhall be endowed in the other lands of the heir.

EVIDENCE, according to the Epicureans, is nothing elfe than that kind of certitude obtained by the fenfes, which, in the opinion of thefe philofophers, are the primary criterion of truth.

By evidence of fenfe the epicureans meant that fpecies, or image, exhibited by the fenfe, or phantafy, which, when all impediments to a juft judging, as diftance, motion, medium, &c. are removed, cannot

not be contradicted, or gainsaid: wherefore the question being put, whether or no a thing be just as it appears: the answer is not given till it have been tried and examined all the ways, and by all the senses that it can be an object of. Some distinguish evidence into objective and formal.

Objective evidence, they say, consists in the clearness or perspicuity of the object; or the object itself so constituted as that it may be clearly and distinctly known. An object may be clearly known, either immediately from the bare explication of the terms of a proposition; or mediately, that is, we may arrive at a clear and distinct knowledge of it, by means of some medium; thus space, according to the Epicureans, becomes evident by reason of motion, because there can be no motion where there is no space.

Formal evidence is the act of the intellect considered as clear and distinct; and this is also immediate, or such as consists or depends upon the primary principles; or it is mediate, and requires some medium whose attribute agrees with the subject of the proposition. The former consists in a certain natural light of the intellect, which is acquired without any study or pains: the latter is found no where but in the conclusion of demonstration, and is therefore termed mediate evidence. See the article DEMONSTRATION.

Others divide evidence into moral, physical, and metaphysical; that is, by how many means the truth appears, by so many is the evidence said to arise: thus, a thing is said to be morally evident, so far as I have a distinct knowledge or notion thereof by unexceptionable witnesses. See the article CERTITUDE.

Physically, so far as natural sense and reason, pointing out any thing, convinces me thereof. Metaphysically, when I enter so fully and clearly into the essence of any thing that nothing can be clearer.

But whatever may be the sentiments of these philosophers concerning evidence, says Chauvinus, this should at least be granted, that the evidence of human knowledge, of what kind soever it be, is not absolute, but comparative: that is, that there is no act in human knowledge quite void of all confusion.

The primary sign of evident knowledge requires that the object known should strike the intellect violently, in like manner as a vehement light beats upon the eye: the second sign requires that the mind should acquiesce, with great calmness and tranquillity, in distinct notions, as it were abiding securely in the midst of the light. The third sign of evidence is sought from subsequent judgments, and transferred to our notions or ideas: for clear and distinct notions will lay the understanding under the necessity of judging, and certain and undoubted judgments follow distinct and clear ideas. The fourth and last sign of evidence is when the common and universal consent of mankind universally agree upon one particular point, it follows that the idea obtained concerning that thing is a clear and distinct one.

Evidence must therefore be allowed the mark of truth; and these things must be allowed true, which carry with them such a degree of evidence as obliges us to assent to them. Whatever we see evidently agreeable to things whereof we speak, that we must acknowledge to be true.

EVIDENCE, in law, any proof, whether it be by testimony of men on oath, or by writings and records so called, because hereby the point in issue is made evident to the jury.

As to evidence, the common law requires no certain number of witnesses, though in some cases the statute-law does. The testimony of one single evidence is sufficient for the crown in all causes, except treason, where there must be two: sometimes violent presumption will be admitted as evidence, without witnesses, as where a person is run thro' the body in a house, and one is seen to come out of that house with a bloody sword. In general, a party interested in a suit, a wife for or against her husband, unless in cases of treason, an alien infidel, persons *non saniæ memoriæ*, such as are convicted of felony, perjury, &c. may not be evidence in the cause: but kinsmen, though never so near, also tenants, servants, masters, attornies for their clients, one of the jurors upon trial, and all others that are not infamous, and who want not understanding, or are no parties in interest, may be allowed to give evidence; tho' the credit of servants is left to the jury.

In cases of crimes, as of robbery on the highway, in an action against the hundred, and rapes of women, &c. a man or woman may be an evidence in their own

own caufe ; fo likewife in private notorious cheats, where none elfe can be witnefs of the circumftances of the fact, but he that fuffers. When any perfon is ferved with a procefs, and refufes to appear to give evidence in a criminal caufe, the court may put off the trial, and grant an attachment againft him ; whereupon he fhall be committed to prifon and fined ; and in a civil caufe an evidence refufing to appear on being tendered his reafonable charges, and he having no lawful excufe, action of the cafe lies againft him, and thereupon 10 l. damages fhall be recovered, and other recompence to the party.

Evidence by writings and records is where acts of parliaments, ftatutes, judgments, fines and recoveries, proceedings of court, and deeds, *&c.* are admitted as evidence. And here it is to be obferved, that the printed ftatute-book is good evidence upon a general act of parliament, which need not be pleaded ; but in the cafe of a private act, it is otherwife : for there it muft be pleaded and examined by the records of parliament, before it can be admitted in evidence. Records and enrolments prove themfelves, and a copy of a record fworn to may be given as an evidence. A record of an inferior court has been rejected in evidence, and the proceedings in county-courts, courts-baron, *&c.* may be denied, and then tried by a jury. A copy of copyhold-lands fhall be an evidence where the rolls are loft. An antient deed proves itfelf : the counter part of a deed is no evidence, when the original is in being, and can be procured.

Although a witnefs fwear to the hand and contents of a letter, if he never faw the party write, it will not be good evidence. And a fhop-book may not be given in evidence for goods fold, *&c.* a ter one year, before the action brought, except there be a bill, *&c.* for the debt : but this does not extend to any buying or felling, or trading between one tradefman and another : here to make books evidences, there muft be the hand of the perfon to them who delivered the goods which is to be proved. In debt, a releafe may be given in evidence, fo may any matters of fact, tampering with witneffes, or fraud.

EVIL, *malum,* in philofophy, *&c.* is either moral or natural.

Moral evil is the difagreement between the actions of a moral agent, and the rule of thofe actions, whatever it be. See the articles ETHICS and GOOD. Moral good and evil coincide with right and wrong, fince that cannot be good which is wrong, nor that evil which is right.

Some make the effence of moral evil confift in the difagreement of our manners to the divine will, whether known by reafon or revelation ; others, in being contrary to reafon and truth ; and others, in being inconfiftent with the nature, faculties, affections, and fituation of mankind.

Be this as it will, no act can be deemed morally evil, unlefs the agent be capable of diftinguifhing, choofing, and acting for himfelf ; or more briefly, is an intelligent and free agent. See the articles AGENT and ACTION.

Natural EVIL, whatever deftroys, or any way difturbs the perfection of natural beings : fuch are blindnefs, difeafes, death, *&c.* See the articles BLINDNESS, DISEASE, DEATH, *&c.*

King's EVIL, in medicine, the fame with the fcrophula. See SCROPHULA.

Hungry EVIL. See BULIMY.

EULOGY, in church hiftory, a name by which the Greeks call the *panis benedictus,* or bread over which a bleffing is pronounced, and which is diftributed to thofe who are unqualified to communicate.

The name eulogiæ was antiently given to the confecrated pieces of bread, which the bifhops and priefts fent to each other, for the keeping up a friendly correfpondence : thofe prefents likewife which were made out of refpect or obligation, were called eulogiæ.

St. Paulinus, bifhop of Nola, about the end of the fixth century, having fent five eulogiæ, at one time, to Romanian, fays, " I fend you five pieces of bread, " the ammunition of the warfare of " Jefus Chrift, under whofe ftandard " we fight."

EUMENIDES, furies, in antiquity. See the article FURIES.

EUNOMIANS, in church hiftory, chriftian heretics, in the fourth century. They were a branch of Arians, and took their name from Eunomius, bifhop of Cyzicus, who was inftructed by Ætius, in the points which were then controverted in the church, after having at firft followed the profeffion of arms. Eunomius fo well anfwered the defigns of his mafter, and declaimed fo vehemently againft the divinity of the WORD, that the

the people had recourſe to the authority of the prince, and had himſelf baniſhed; but the Arians obtained his recall, and elected him biſhop of Cyzicus. The manners and doctrines of the Eunomians were the ſame with thoſe of the Arians.

EUNUCH, ευνȣχ**ℴ**, a caſtrated perſon. See the article CASTRATION.

In Britain, France, *&c.* eunuchs are never made, but upon occaſion of ſome diſeaſe, which renders ſuch an operation neceſſary: but in Italy, they make great numbers of children, from one to three years of age, eunuchs, every year, to ſupply the opera's and theatres of all Europe with ſingers: though it is not one in three, that, after having loſt their virility, has a good voice for a recompence. In the eaſtern parts of the world, they make eunuchs in order to be guards or attendants on their women. The ſeraglio of the eaſtern emperors are chiefly ſerved and guarded by eunuchs; and yet, from good authority, we learn, that the rich eunuchs in Perſia and other countries keep ſeraglio's for their own uſe. Thoſe who, out of an imprudent zeal to guard themſelves from ſenſual pleaſures, made themſelves eunuchs, were, by the council of Nice, condemned and excluded from holy orders. There are ſeveral ſevere prohibitions in Germany againſt the making of eunuchs; and in France an eunuch muſt not marry, not even with the conſent of the woman.

EUNUCHS, in church hiſtory, a ſet of heretics, in the third century, who were mad enough to caſtrate, not only thoſe of their own perſuaſion, but even all others that they could lay hold of: they took their riſe from the example of Origen, who, miſunderſtanding the following words of our Saviour,——"And "eunuchs who made themſelves eu-"nuchs for the kingdom of heaven," caſtrated himſelf.

EVOCATION, EVOCATION, in roman antiquity, a ſolemn invitation preferred by way of prayer, to the gods and goddeſſes of a beſieged town, to forſake it and come over to the Romans.

The form of evocation uſed at taking the city of Carthage is related by Macrob. Sat. III. 9. in the following words. *Si deus, ſi dea es, cui populus, civitaſque Carthaginienſis eſt in tutela, teque maxime ille, qui urbis hujus, populique tutelam recepiſti, precor, veneror que, veniamque a vobis peto, ut vos populum civitatemque Carthaginienſium deſeratis, loca, templa, ſacra, urbemque eorum relinquatis, abſque his abeatis: eique populo, civitatique metum, formidinem, oblivionem injiciatis, proditique Romam ad me meoſque veniatis; noſtraque vobis loca, templa, ſacra, urbs acceptior, probatiorque ſit: mihi quoque, populoque Romano, militibuſque meis præpoſiti ſitis, ut ſciamus, intelligamuſque,* &c. *ſi ita feceritis, voveo vobis templa, ludoſque facturum.*

They always took it for granted that their prayer was heard, and that the gods had deſerted the place and came over to them, provided they were able to make themſelves maſters of it.

EVOCATORIÆ *epiſtolæ*, among the Romans, letters ſent by the emperors to command the attendance of any perſon; or letters granting licence to any one to wait on the emperor; every perſon not being allowed this privilege till they had deſired and obtained the *evocatoriæ epiſtolæ.*

EVOLUTE, EVOLUTA, in the higher geometry, a curve, which, by being gradually opened, deſcribes another curve. Such is the curve B C F; (plate XCIV. fig. 4.) for if a thread F C M be wrapped about, or applied to, the ſaid curve, and then unwound again, the point M thereof will deſcribe another curve A M M, called by Mr. Huygens, a curve deſcribed from evolution. The part of the thread, M C, is called the radius of the evolute, or of the oſculatory circle deſcribed on the center C with the radius M C.

Hence, 1. when the point B falls in A, the radius of the evolute M C is equal to the arch B C; but if not, to A B and the arch B C. 2. The radius of the evolute, C M, is perpendicular to the curve A M. 3. Becauſe the radius M C of the evolute continually touches it, it is evident from its generation, that it may be deſcribed through innumerable points, if the tangents in the parts of the evolute are produced until they become equal to their correſponding arches. 4. The evolute of the common parabola is a parabola of the ſecond kind, whoſe parameter is $\frac{27}{16}$, of the common one. 5. The evolute of a cycloid is another cycloid equal and ſimilar to it. 6. All the arches of evolute curves are rectifiable, if the radii of the evolute can be expreſſed geometrically. Thoſe who deſire a more particular account of theſe curves,

curves, may consult Huygens's Horologium Oscillatorium, Sir Isaac Newton's and Mac-Laurin's Fluxion's, and Wolfius.

EVOLUTION, in algebra, the extraction of roots. See the article EXTRACTION.

EVOLUTION, in the art of war, the motion made by a body of troops, when they are obliged to change their form and disposition, in order to preserve a post, or occupy another, to attack an enemy with more advantage, or to be in a condition of defending themselves the better.

It consists in doublings, counter-marches, conversions, &c. A battalion doubles the ranks, when attacked in front or rear, to prevent its being flanked, or surrounded; for then a battalion fights with a larger front. The files are doubled either to accommodate themselves to the necessity of a narrow ground, or to resist an enemy which attacks them in flank; but if the ground will allow it, conversion is much preferable, because after conversion the battalion is in its first form, and opposes the file leaders, which are generally the best men to the enemy; and likewise, because doubling the files in a new, or not well disciplined regiment, they may happen to fall into disorder. See the article DOUBLING.

EUONYMUS, the SPINDLE-TREE, in botany, a genus of the tetrandria monogynia class of plants, the corolla whereof consists of four ovated, plane, and patent petals, longer than the cup: the fruit is a succulent, coloured capsule, of a quadragonal figure, formed of four valves, terminating in four points, and forming four cells: the seeds are single, of an oval figure, and covered with a calyptra. See plate XCIV. fig. 5.

The fruit of this plant provokes vomiting, is a stomachic, and purges by stool; however, it is dangerous, and should be taken cautiously.

EVORA, or EBORA, a city of Portugal, seventy miles south-east of Lisbon. It is an archbishopric and university, and is situated in one of the pleasantest and most fruitful countries of that kingdom. See the article PORTUGAL.

EUPATORIUM, HEMP AGRIMONY, in botany, a genus of the syngenesia-polygamia æqualis class of plants, the compound corolla of which is uniform and tubulose; the hermaphrodite flowers are equal; the partial flower is infundibuliform; the fruit is naked, only covered by the cup: the seeds are oblong, and crowned with a plumose down.

This plant is hepatic and vulnerary; but the principal use of it is in cachexies, catarrhs, and in suppressions of urine and the menses: the root purges just in manner of the white hellebore.

EUPHEMIA, a port-town of the further Calabria, in Naples, fifty miles northeast of Reggio.

EUPHEMISM, ευφημισμος, in rhetoric, a figure which expresses things in themselves disagreeable and shocking, in terms implying the contrary quality: thus, the Pontus, or Black Sea, having the epithet αξενος, i. e. inhospitable, given it, by reason of the savage cruelty of those who inhabited the neighbouring countries, this name, by euphemism, was changed into that of Euxinus. Thus *Ovid Trist. lib.* iii. *el.* 13.

Dum me terrarum pars penè novissima Ponti
Euxinus falso nomine dictus habet.

And again, in *Trist. lib.* v. *el.* 10.

Quem tenet Euxini mendax cognomine litus.

In which significations, nobody will deny its being a species of irony: but every euphemism is not irony, for we sometimes use improper and soft terms in the same sense with the proper and harsh.

EUPHONY, ευφωνια, in grammar, an easiness, smoothness, and elegance in pronunciation.

Euphony is properly a figure, whereby we suppress a letter that is too harsh, and convert it into a smoother, contrary to the ordinary rules: of this there are abundance of examples, in all languages.

EUPHORBIA, in botany a genus of the polyandria-monogynia class of plants, comprehending the tithymalus or spurge, the euphorbium properly so called, the tithymaloides, and the esula of authors.

The flower consists of four or five petals, which are thick, gibbous, turbinated and truncated: the fruit is a roundish trilocular capsule, containing a single roundish seed.

The euphorbium has a fleshy or angular stalk, and the petals in some species are trifid; the tithymalus has leaves on the stalk, which the others have not; and the tithymaloides has the calyx gibbous on the under side. See the article EUPHORBIUM, &c.

EUPHORBIUM, in pharmacy, a gum

refin

resin brought us always in loose smooth, and glossy gold-coloured drops or granules. It is the produce of the euphorbium antiquorum verum, which grows to ten or twelve feet high. Its principal use is externally in sinapisms, and plasters applied to the feet, which are intended to stimulate, but not absolutely to raise blisters: for it is observed by Avisenna, that when taken internally in large doses, it has been found to exulcerate the intestines, and bring on death itself, after the most terrible symptoms.

EUPHRASIA, EYE-BRIGHT, in botany, a genus of the didynamia-angiospermia class of plants, the corolla of which consists of a single ringent petal; the tube is of the length of the cup; the upper lip is concave and emarginated; the lower one is patent, and divided into three segments: the fruit is an ovato-oblong, compressed capsule, forming two cells: the seeds are numerous, very small, and of a roundish figure.

This plant is an ophthalmic and cephalic, and good for a weak memory.

EUPHRATES, the finest river in Turky in Asia, has two sources, northward of the city of Erzerum, in 40° north latitude. After passing through Armenia, it divides Syria from Diarbeck or Assyria, runs through Eyraca or Chaldea; and uniting with the Tygris, it passes by the city of Bassora, fifty miles below which it falls into the gulph of Persia.

EUREUX, a city of Normandy in France, capital of a territory of the same name, situated 25 miles south of Rouen. East. long. 1° 12′. North lat. 49° 5′.

EURIPUS, a strait between the island of Negropont, and the continent of Greece, remarkable for its irregular tides.

The term euripus is sometimes used, in a more general sense, for any straits, where the water is much agitated.

EUROPE, the least of the four grand divisions of the earth, is situated between 36° and 72° north latitude; and between 10° degrees west longitude, and 65° east longitude; being about 3000 miles long from north to south, and 2500 miles broad from east to west. It is bounded by the frozen ocean on the north, by Asia on the east, by the Mediterranean, which separates it from Africa, on the south, and by the Atlantic ocean on the west.

Europe is commonly subdivided into three grand divisions, north, middle, and south. The north or upper division comprehends Russia or Muscovy, Sweden, Denmark, and Norway, and the islands of Britain, Iceland, Greenland, and those of the Baltic. The middle division contains Poland, Germany, and the hereditary dominions of the house of Austria, the Low Countries, or Netherlands, and France. The southern division comprehends Turky in Europe, the antient Greece chiefly, Switzerland, Italy, Spain and Portugal, and the islands of Scily, Sardinia, Corsica, Majorca, Minorca, Ivica, and those of the Archipelago. See the articles RUSSIA, SWEDEN, DENMARK, *&c.*

EURYTHMY, in architecture, painting, and sculpture, is a certain majesty, elegance, and easiness, appearing in the composition of divers members, or parts of a body, painting or sculpture, and resulting from the fine proportion of it. Vitruvius ranks the eurythmia among the essential parts of architecture: he describes it as consisting in the beauty of the construction, or assemblage of the several parts of the work, which renders its aspect, or its whole appearance, grateful; *e. gr.* when the height corresponds to the breadth, and the breadth to the length. Evelyn, in his account of architecture, says, that from these three ideas, or designs, *viz.* orthography, scenograghy, and profile, it is, that the same eurythmia, majestic and beautiful appearance of an edifice does result, which creates that agreeable harmony between the several dimensions, *i. e.* between the length, breadth, and height of each room in a fabric, so that nothing seems disproportional, too long for this, or too broad for that, but corresponds in a just and regular symmetry and consent of all the parts with the whole.

EUSTATHIANS, the same with the catholics of Antioch, in the IVth century, so called from their refusing to acknowledge any other bishop beside St. Eustathius, who was deposed by the Arians.

EUSTACE, or EUSTATIA, one of the Caribbee-islands, four miles west of St. Christopher's, and subject to the Dutch.

EUSTYLE, in architecture, a sort of building in which the pillars are placed at the most convenient distance one from another, the intercolumniations being just two diameters and a quarter of the column,

lumn, except those in the middle of the face, before and behind, which are three diameters distant.

EUTYCHIANS, in church-history, heretics in the Vth century, who embraced the errors of the monk Eutyches, maintaining that there was only one nature in Jesus Christ. The divine nature according to them, had so entirely swallowed up the human, that the latter could not be distinguished; insomuch, that Jesus Christ was merely God, and had nothing of humanity but the appearance. This heresy was condemned in a council held at Constantinople in 448, which sentence was confirmed by the general council of Chalcedon, in 451.

EUXINE, the same with the Black-sea. See the article BLACK-SEA.

EWE, the english name of a female sheep. See the article SHEEP.

EWRY, in the british customs, an office in the king's houshold, which has the care of the table-linen, of laying the cloth, and serving up water, in silver ewers, after dinner.

EXACTION, in law, a wrong done by an officer, or a person in pretended authority, in taking a reward or fee, that is not allowed by law.

A person guilty of exaction may be fined and imprisoned. It is often confounded with extortion. See EXTORTION.

EXACTOR REGIS, is sometimes taken for the sheriff, though more generally it denotes any person that collects the public monies, &c.

EXACUM, in botany a genus of the tetrandria-monogynia class of plants: the flower is monopetalous, patent, and divided into four segments at the limb; the fruit is a bilocular capsule, marked with two deep furrows, opening at the top, and containing numerous seeds.

EXÆRESIS, in surgery, the operation of extracting or taking away something that is hurtful to the human body.

EXAGGERATION, in rethoric, a kind of hyperbole, whereby things are augmented or amplified, by saying more than the truth, either as to good or bad.

There are two kinds of exaggeration, the one of things, the other of words. The first is produced, 1. By a multitude of definitions. 2. By a multitude of adjuncts. 3. By a detail of causes and effects. 4. By an enumeration of consequences. 5. By comparisons. And, 6. By the contrast of epithets and rational inference.

Exaggeration by words is effected, 1. By using metaphors. 2. By hyperboles. 3. By synonymous terms. 4. By a collection of splendid and magnificent expressions. 5. By periphrasis. 6. By repetition. And, lastly, by confirmation with an oath; as for example, *Parietes, medius fidius, gratias tibi agere gestiunt.* See METAPHOR and HYPERBOLE.

EXAGGERATION, in painting, a method by which the artist, in representing things, charges them too much, or makes them too strong, either in respect of the design or the colouring. It differs from caricaturing, in that the latter perverts or gives a turn to the features of a face, &c. which they had not; whereas exaggeration only heightens or improves what they had.

EXALTATION, elevation, in a figurative sense, is applied to denote the inauguration, coronation, &c. of the pope. See the articles INAUGURATION, &c.

EXALTATION *of the cross*, in church-history. See the article CROSS.

EXALTATION, in astrology, is a dignity which a planet acquires in certain signs or parts of the zodiac, which dignity is supposed to give it an extraordinary efficacy and influence. Thus the 15° of cancer is the exaltation of jupiter, according to Albumazar; that of the sun is the 19° of aries, and that of the moon is in taurus.

EXALTATION, in chemistry, signifies an operation by which a substance has its properties changed and raised to a higher degree of dignity and virtue.

There are two kinds of exaltation: 1. Maturation, which is nothing but the raising and promoting a thing from a crude to a mature and perfect state. And, 2. Gradation.

EXAMINATION, an exact and scrupulous disquisition or enquiry, in order to find out the truth of any thing.

Self-EXAMINATION, by way of preparation to repentance, is reduced by divines to five points: 1. A returning thanks to God for his benefits. 2. A begging of grace and light, to know and distinguish our sins. 3. An enquiry into all our words, thoughts, and actions, in order to learn what has been offensive to God. 4. A begging of pardon, and conceiving a sincere sorrow for having displeased him. 5. Making a firm resolution not to offend him any more; and taking the necessary precautions to preserve ourselves from it.

EXAMINERS, in chancery, two officers of that court, who examine, upon oath, witnesses

witnesses produced in causes depending there, by either the complainant or defendant, where the witnesses live in London, or near it. Sometimes parties themselves, by particular order, are examined. In the country, above twenty miles from London, on the parties joining in commission, witnesses are examined by commissioners, being usually counsellors or attornies, not concerned in the cause. See the article CHANCERY.

EXAMPLE, in rhetoric, is a way of reasoning, by which a particular fact is produced, or cleared up, by another that is similar to it.

EXANNUAL ROLL, that wherein, according to the old way of exhibiting sheriffs accounts, the illeviable fines and desperate debts were transcribed.

This roll was yearly read over to the sheriffs, to see what might be gotten thereby.

EXANTHEMA, ἐξάνθημα among physicians, denotes any kind of efflorescence or eruption, as the measles, purple spots in the plague, or malignant fevers, *&c.*

EXARCH, ἔξαρχος, in antiquity, an officer sent by the emperors of the east, into Italy, in quality of vicar, or rather præfect, to defend that part of Italy which was yet under their obedience, and particularly the city of Ravenna, against the Lombards. The exarch resided at Ravenna, which place, with Rome, was all that was left to the emperors, of their italian dominions. The first exarch was under Justin the younger, in the year 567, after Belisarius and Narses had driven the barbarians out of Italy. The last was Eutychius, defeated by Adolphus king of the Lombards, in 752. But Pepin, king of France, deprived him of the exarchate, and made a gift of it to the pope, ordering his chaplain to lay the keys of all the towns on the altar of St. Peter and Paul at Rome.

EXARCH *of a diocese* was the same with primate. See the article PRIMATE.

EXARCH also denotes an officer still subsisting in the greek church, being a kind of visitor, or one deputed by the patriarch into provinces, to see whether the bishops do their duty, and whether the rest of the clergy observe the canons of the church.

There is another officer also of this name under the patriarchs of the greek church, who has the care and inspection of the patriarchal monasteries, or such as depend immediately on the patriarch.

EXARCHOS is a name given by Homer, Philo, and other antient writers, for the choragus, or he who sung first in the antient chorus. See the articles CHORAGUS and CHORUS.

EXARTICULATION, in surgery. See the article LUXATION.

EXAUCTORATION, *exauctoratio*, in roman antiquity, corresponded, in some measure, to our keeping soldiers or sailors in half-pay; but differed in this, that the exauctorati milites were deprived of their pay and arms, without being absolutely discharged. Sometimes, indeed, it signifies a full, but ignominious discharge.

EXCALCEATION, among the Hebrews, was a particular law, whereby a widow, whom her husband's brother refused to marry, had a right to summon him to a court of justice, and, upon his refusal, might excalceat him, that is, pull off one of his shoes, and spit in his face; both of them actions of great ignominy.

EXCAMBIATORS, in our old customs, persons employed in exchanging lands, much the same as our brokers are between merchants. See the article BROKER.

EXCELLENCY, a title antiently given to kings and emperors, but now to embassadors, and other persons, who are not qualified for that of *highness*, and yet are to be elevated above the other inferior dignities.

In England and France the title is now peculiar to embassadors, but very common in Germany and Italy. Those it was first appropriated to, were the princes of the blood of the several royal houses; but they quitted it for that of *highness*, upon several great lords assuming excellency. The embassadors have only bore it since the year 1593, when the pope complimented the duke de Nevers, embassador from Henry IV. of France, with the title of excellency; and though it was on account of his birth, and not of his character, yet the embassadors of all nations have ever since claimed the same appellation.

The embassadors of Venice have only had the title of excellency since the year 1636, when the emperor and king of Spain consented to allow it to them. The court of Rome never allows that title to any embassador who is a churchman, as judging it a secular title.

The embassadors of France at Rome, antiently gave the title of excellency to all the relations of the pope then reigning,

reigning, and to several other noblemen; but now they are more reserved in that respect; though they still treat all the roman princes with excellency: on the other hand, the court of Rome bestows the same title on the chancellor, ministers, and secretaries of state, and presidents of the sovereign courts of France, the presidents of the councils in Spain, and the chancellor of Poland, if they are not ecclesiastics.

EXCENTRIC, in geometry, a term applied to circles and spheres which have not the same center, and consequently are not parallel; in opposition to concentric, where they are parallel, having one common center.

EXCENTRIC *circle*, in the ptolemaic system, the very orbit of the planet itself, which it was supposed to describe about the earth. It was also called the deferent. See the article DEFERENT.

EXCENTRIC *circle*, in the new astronomy, a circle described from the center of the orbit of the planet, with half the axis as a radius.

EXCENTRIC *equation*, in the old astronomy, is an angle made by a line drawn from the center of the earth, and another drawn from the center of the excentric to the body or place of any planet, the same with the prostaphæresis; and is equal to the difference (accounted in an arch of the ecliptic) between the sun's or planet's real and apparent place.

EXCENTRIC *place of a planet*, is the very point of the orbit, where the circle of inclination coming from the place of a planet in its orbit, falls thereon with right angles.

Anomaly of the EXCENTRIC. See the article ANOMALY.

EXCENTRICITY, in the old astronomy, is the distance of the center of the orbit of a planet from the center of the earth.

It is generally allowed that saturn, jupiter, mars, venus, and mercury, have such an excentricity, because they appear to us of different magnitudes at different times, which could only proceed from hence that their orbits being excentric to the earth, in some parts thereof they are nearer us, and in others more remote. But some dispute has been made about the excentricities of the sun and moon. Many people maintain that the sun and moon appear sometimes larger, and sometimes less; not that they are nearer us at one time than at another, but because they are viewed through different columns of air, which producing a difference in the refraction of their light, may occasion those different appearances. Others again take the excentricities of the sun and moon to be sufficiently proved, both from eclipses, from the moon's greater and less parallax at the same distance from the zenith, and from the sun's being observed to continue longer in the northern than in the southern hemisphere.

EXCENTRICITY, in the new astronomy, is the distance of the center of the orbit of a planet from the center of the sun, that is, the distance between the center of the ellipsis and the focus thereof.

It is also called simple or single excentricity.

To find the EXCENTRICITY *of the earth's orbit, and the place of the apsides.* Take an observation of mars when he is in opposition with the sun, and then, if mars be in M (plate XCIV. fig. 3.) the sun in S, and the earth in T, they will be all in the same right line M T S. When mars, after 687 days, returns again to the same point M, and the earth not reaching the same till after 730½ days, in which time she completes two revolutions in her orbit, is found in the point A, observe the place of the sun seen from the earth by the right line A S, and the place of mars seen by the right line A M. We have, therefore, by means of the sun's place in E, at the time of the second observation, and his place in F, at the time of the first observation, the angle E S F given, to which the angle M S A is equal. And by knowing the place of the sun and mars in the second observation, we have the distance of mars from the sun, or the angle M A S. In the same manner may be found the angle M S B, and B S the distance of the earth from the sun in decimal parts of M S, when mars returns a second time to M, and likewise the angle M S C, and the right line S C, when mars returns a third time to M. Wherefore since the focus of the earth's orbit is in S, and A, B, and C are points in that orbit, the line of the apsides will be determined, the orbit will be described, and consequently the excentricity will be known. The excentricity of all the primary planets, and the position of the line of apsides may be found in the same manner, if three heliocentric places of the planet, together with its true distance from the sun are known. But it must be observed, that we suppose that the planet, in the same point of its orbit,

orbit, has the same distance from the sun, which we may easily suppose on account of the slowness of the motion of the aphelia.

The excentricities of the several orbits of the planets are as follow; supposing the distance of the earth from the sun, 1000 equal parts:

The excentricity of mercury's orbit is about	80	of such parts.
Venus's	5	
The earth's	17	
Mars's	141	
Jupiter's	250	
Saturn's	547	

The excentricity of the moon's orbit is about 3,3 of the semi diameter of the earth, and now and then it grows greater and now and then it diminishes. It is greatest when the line of the apsides is coincident with the syzygia, or is in the line which joins the centers of the sun and earth. And the excentricity is least when the line of the apsides cuts the other at right angles. The difference between the greatest and least excentricity is so considerable, that it exceeds the half of the least excentricity.

Double EXCENTRICITY, is the distance between the two foci in the ellipsis, which is equal to twice the single excentricity.

EXCEPTION, in law, denotes a stop or stay to an action, and is either dilatory or peremptory, in proceedings at common law: but in chancery it is what the plaintiff alledges against the sufficiency of an answer, *&c.*

An exception is no more than the denial of what is taken to be good by the other party, either in point of law, or pleading. The council in a cause are to take all their exceptions to the record at one time, and before the court has delivered any opinion of it.

EXCEPTION *to evidence*, is where a demurrer is offered in any civil cause, for the insufficiency of the evidence given, and the court does not agree to it; in such case, the court, upon request, is to seal a bill of exceptions to the evidence, which may be heard on a writ of error. A plaintiff or defendant may also alledge any exception to the judge's opinion, praying the same to be allowed; and if the judge refuses it, then the party concerned is to write it down, and, when signed by council, require the judge to seal the same, to be heard afterwards.

EXCEPTIONS *in deeds and writings*, is the saving a particular thing out of a general one granted by deed, as a room, shop, or cellar out of a house; a field, or timber trees, out of land, *&c.*

Exceptions of this kind must be something serviceable, and if they cross the grant, or are repugnant thereto, they are void of course. Yet there may be a kind of exception, or saving out of an exception, so as to make a thing as if never excepted; as where a lease is made of a rectory, excepting the parsonage-house, saving to the lessee a chamber, this shall pass by the lease.

EPCEPTIVE, something that contains exceptions; such are exceptive propositions. See the article PROPOSITION.

EXCESS, in arithmetic and geometry, is the difference between any two unequal numbers or quantities, or that which is left after the lesser is taken from or out of the greater. See SUBTRACTION.

EXCHANGE, in a general sense, a contract, or agreement, whereby one thing is given or exchanged for another. See the article BARTERING.

EXCHANGE, in commerce, implies the trade of money, carried on between one place and another, by means of bills of exchange. See the article BILL.

The original traffic of mankind becoming troublesome, necessity led them to the invention of some more easy manner of continuing their commerce, for which end money was thought the most commodious medium, and consequently this was, many ages since, adopted to carry on their trade; and still, for a greater convenience of foreign trade, they not only made coins of the most valuable metals, but by degrees, fell into an improvement even of this, and substituted remittances and exchange, by bills, to save the expence and risque which the portage of money from one kingdom to another occasioned.

But as commerce varied, so did exchange too, though long ago they were generally reduced in Europe into four, *viz.* cambio commune, cambio real, cambio sicco, and cambio fictitio.

Cambio commune, in England, was that which was constituted by the several kings, who, having received monies in England, would remit the like sum by exchange, to be paid in another kingdom, according to the value of the different coins current in these countries. Cambio real was when monies were paid to the exchanger, and bills were drawn without naming the species, but according to the value

value of the feveral coins; and was no more than the payment of money in England, with a provifo to be paid the juft value in fpecie, in another country, according to the price agreed on between the exchanger and deliverer, to allow or pay for the exchange of the money and the lofs of time. Cambio ficco, or dry exchange, is when a merchant has occafion for 500 l. for a certain time, and would pay intereft for it; but the lender, being defirous to take more than the ftatute allows, and yet willing to avoid its penalty, offers the 500 l. by exchange for Cadiz, to which the merchant agrees; but having no correfpondent there, the lender defires him to draw his bill on the faid place, payable at double or triple ufance, by any feigned perfon, as the exchange fhall then govern, with which the merchant complies; and on receipt of the bill, the banker pays the money and remits the bill to fome friend at Cadiz, which with the exchange and intereft, the merchant is to pay his creditor: thefe expences formerly were very confiderable. Cambio fictitio is when a merchant hath occafion for goods, but cannot fpare money for their payment; and the owner of them, to fecure his advantage, and avoid the penalty of the law, acts as the ufurer in the former cafe, and obliges the buyer to defray the expences of re-exchange, &c.

The juft and true exchange for monies, that is at this day ufed both in England and other countries, by bills, is *par pro pari*, or value for value. Thus the englifh exchange is grounded on the weight and finenefs of our own money, and the weight and finenefs of thofe of each other country, according to their feveral ftandards, and proportionable to their valuations, which being truly and juftly made, afcertains and reduces the price of exchange for a fum certain for the exchange of monies to any country whatever. As money is the common meafure of things between man and man within the realm, fo is exchange between merchant and merchant both within and without the realm; the which is properly made by bills, when money is delivered fimply here in England, and bills received for the repayment of the fame in fome other country, either within or without the realm, at a price certain, agreed on between the merchant and the deliverer; for there is not at this day any peculiar or proper money to be found in fpecie, where-on outland exchanges can be grounded; therefore, all foreign coins are called imaginary.

As the monies and fpecies of almoft every nation differ not only in their current prices, but alfo in their intrinfic value, there is a juft and certain par eftablifhed between them, according to the real and effective worth of each fpecies, without any regard to their currency in the countries where they are coined; and the par is, by fome authors, fuppofed to be of two forts, *viz.* the one of real monies, the other of exchanges, or imaginary fpecies, though both feem to be the fame thing, as having a neceffary dependance on each other. See the article Par.

The relative abundance and fcarcity of fpecie in different countries, form what is called the courfe of exchange. This fcarcity or plenty, from whence refults the mutability of the courfe of exchange, is not the real, but a relative fcarcity or plenty; for example, when France has greater occafion for funds in Holland, than the Dutch of having funds in France, fpecie is faid to be common in France, and fcarce in Holland; and *vice verfa.* See Ballance *of trade.*

In order to judge of the fcarcity or plenty of fpecie, we muft know, for example, that if there are more bills from Holland than there are from France, then fpecie is fcarce in France, and common in Holland: it then becomes neceffary that the exchange fhould rife, and the Dutch give more for fpecie of the fame value in France, than the French for that of an equivalent value in Holland. When money of the fame ftandard and weight in France, yields money of the fame ftandard and weight in Holland, it is faid that the exchange is at par. In the actual ftate of fpecie, which was in 1744, the par was nearly at 54 grofs to the French crown of three livres. When the exchange is above 54 grofs, the French fay it is high; when beneath, they fay it is low.

In order to know the lofs and gain of a ftate in a particular fituation of exchange, it muft be confidered as debtor and creditor, as buyer and feller. When the exchange is below par, it lofes as debtor, and gains as creditor; it lofes as buyer, and gains as feller. It is obvious it lofes as debtor. Suppofe, for example, France owes Holland a certain number of gros, the greater number of gros there are in a crown, the more crowns fhe has to pay. On the contrary, if France is creditor for a certain

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a certain number of gros, the leſs number of gros there are in a crown, the more crowns ſhe will receive. The ſtate loſes alſo as a buyer; for there muſt be the ſame number of gros to buy the ſame quantity of merchandiſe; and while the exchange is low, every french crown is worth fewer gros: for the ſame reaſon, the ſtate gains as ſeller: you ſell your merchandiſe in Holland for a certain number of gros: you receive then more french crowns, when for every fifty gros you receive a crown, then you would do if you received the ſame crown for every 54. The contrary to this takes place in the other ſtate. If the Dutch are indebted a certain number of crowns to France, they will gain; if they are owing to them, they will loſe; if they ſell, they loſe; if they buy, they gain.

Again, when the exchange between France and Holland is below par; for example, if it ſhould be at 50 inſtead of 54, it ſhould follow, that France, on ſending bills of exchange to Holland for 54,000, could buy merchandiſes only to the value of 50,000; and that, on the other hand, the Dutch ſending the value of 50,000 to France, might buy 50,000 crowns, which makes a difference of $\frac{8}{54}$, that is, a loſs of more than $\frac{1}{7}$; ſo that France would be obliged to ſend to Holland $\frac{1}{7}$ more in ſpecie or merchandiſe, than ſhe would do was the exchange at par; and as the miſchief muſt conſequently increaſe, becauſe a debt of this kind would bring the exchange ſtill lower, France would in the end be ruined.

It ſeems, we ſay, as if this ſhould certainly follow; and yet it does not, becauſe ſtates conſequently lean towards a ballance, in order to preſerve their independency. Thus they borrow only in proportion to their ability to pay, and meaſure their buying by what they ſell; and taking the example from what has been ſaid, if the exchange happens to fall in France from 54 to 50, the Dutch, who buy merchandiſes in France to the value of a thouſand crowns, for which they uſed to pay 54,000 gros, would now only pay 50,000, if the French would conſent to it. But the merchandiſe of France will riſe inſenſibly, and the profit will be ſhared between the French and the Dutch; for when a merchant can gain, he eaſily ſhares his profit: there then ariſes a communication of profit between the French and the Dutch.

In the ſame manner, the French who bought merchandiſes of Holland for 54,000 gros, and who, when the exchange was at 54, paid for them 1000 crowns, will be obliged to add $\frac{4}{54}$ more in french crowns, to buy the ſame merchandiſes. But the french merchant, being ſenſible of the loſs he ſuffers, will take up leſs of the merchandiſe of Holland: the french and the dutch merchant will then be both loſers, the ſtate will inſenſibly fall into a ballance, and the lowering of the exchange will not be attended with theſe inconveniencies we had reaſon to fear.

A merchant may ſend his ſtock into a foreign country, when the exchange is below par, without injuring his fortune, becauſe when it returns, he recovers what he had loſt; but a prince, who ſends only ſpecie into a foreign country, which can never return, is always a loſer.

When the merchants have great dealings in any country, the exchange there infallibly riſes. This proceeds from their entering into many engagements, buying great quantities of merchandiſes, and drawing upon foreign countries to pay for them.

A prince may amaſs great wealth in his dominions, and yet ſpecie may be really ſcarce, and relatively common: for inſtance, a ſtate is indebted for many merchandiſes to a foreign country, the exchange will be low, though ſpecie be ſcarce.

The exchange of all places conſtantly tends to a certain proportion, and that in the very nature of things. If the courſe of exchange from Ireland to England is below par, that of Ireland to Holland will be ſtill lower: that is, in a compound ratio of that of Ireland to England, and that of England to Holland: for a dutch merchant, who can have his ſpecie indirectly from Ireland, by the way of England, will not chooſe to pay dearer, by having it the direct way.

This, we ſay, ought naturally to be the caſe; but, however, it is not exactly ſo: there are always circumſtances which vary theſe things; and the different profit of drawing by one place, or of drawing by another, conſtitutes the particular art and dexterity of the foreign bankers. See the article BANKER.

This is what in a great meaſure conſtitutes what is called arbitration in exchanges, which is defined to be a truck, which two bankers mutually make of their

their bills upon different parts, at a conditional price, and course of exchange. This is the most beneficial, as well as the most delicate branch of exchange to be thoroughly informed of.

1. Before any one applies himself to the study of this subject, it is necessary that he should be well skilled in the practical operations, in regard to the reducing of the sterling money of England into the foreign monies of exchange and of account of all places throughout Europe, acording to the direct courses of exchange established for these purposes, and *vice versa*.

2. That he should be acquainted with the methods of converting sterling money into the monies of exchange and of account of all other places of commerce, wherewith England has no direct established courses of exchange, but is under the necessity of making use of the intermediate exchanges of other places; together with the nature of the agios, and the manner of converting their bank monies into current, and the reverse. See the article Agio.

3. The manner of calculating all the foreign monies of Europe into those of every other distinct country, either according to the direct or intermediate exchange, which makes a much greater variety of cases than those who are not acquainted with this extensive subject can imagine.

4. It is necessary also to know the intrinsic value of foreign monies, according to the most accurate assays which have been made for that purpose; and this the reader will find done to his hand under the article coin. See Coin.

5. Lastly, it is requisite to understand the general natural causes of the rise and fall of the courses of exchange between nation and nation, or between one trading city and another in the same nation; which depends upon the ballance of trade being either in favour of, or against a nation or trading city.

Another method of considering the arbitration of exchanges, is founded upon comparing the various occasional prices of exchange between nation and nation, in order to discover at all times, whether certain courses continue in an equality of proportion, or how far they deviate therefrom; by which means the advantage to be made by such a comparison of exchanges may be exactly ascertained, for the government of the merchant or remitter, to take his measures accordingly, and not to let the advantageous occasion escape his cognizance. And this must necessarily prove the case, provided a person is not accomplished in this branch of the exchanges; and here it will be proper to observe, that in a comparison or combination of the courses of exchange of several places together, it is rare that they happen to ebb and flow in an exact equality of proportion; the reason whereof must be obvious to every one who considers, that the ballance of trade differs between different nations; which being the case, the judgment of the exchange-negotiator consists in vigilantly observing, from a due comparison of the courses, where the greatest inequality of proportion lies: for there lies the greatest profit to be made, by drawing and remitting to certain places preferably to others.

But the greatest profit to be made this way, does not always happen to arise from a comparison of these courses only, where the general currency of a trader's business lies: on the contrary, from the nature and circumstances of the trade of such countries, the rise and fall of the courses may generally continue in such an equality of proportion, as only occasionally, or seldom, to admit of any extra profit by the exchange. When the exchange is lower than the specie of a country, a profit may be made by sending it abroad; when it is higher than the specie, there is a profit in causing it to return: but there is a case in which profit may be made by sending the specie out of the kingdom, when the exchange is at par; that is, by sending it into a foreign country, to be coined over again. When it returns, an advantage may be made of it, whether it be circulated in the country, or paid for foreign bills.

Exchange signifies also a place in most considerable trading cities, wherein the merchants, negociants, agents, bankers, brokers, interpreters, and other persons concerned in commerce, meet on certain days, and at certain times thereof, to confer and treat together of matters relating to exchanges, remittances, payments, adventures, assurances, freightments, and other mercantile negociations, both by sea and land.

These assemblies are held with so much exactness, that the absence of a merchant, &c. makes him suspected of drawing to a

a failure of bankruptcy, as not being able to ſtand the change.

The moſt conſiderable exchanges in Europe, are thoſe of Amſterdam, and that of London, called the royal-exchange. See the article ROYAL-EXCHANGE.

EXCHANGE, in law, ſignifies a mutual grant of lands or tenements, the one in exchange for the other.

This word, in our law, is peculiarly uſed for that compenſation which the warrantor muſt make to the warrantee, value for value, in caſe the land warranted be taken, or recovered from the warrantee. Exchanges are made of lands in fee, tail, or for term of life, *&c.* where a perſon is ſeiſed of certain lands or tenements, and another is ſeiſed of other lands, *&c.* thoſe two perſons may exchange their lands, ſo that each of them ſhall have the other's lands ſo exchanged. But in this exchange the eſtates granted muſt be equal; for ſhould one have an eſtate in fee in his land, and the other an eſtate in the other land only for term of life, or in tail, ſuch exchange is void, on account of the unequality; though, if the eſtates are equal, as eſtate in fee for another in fee, tail for tail, *&c.* the exchange will be good, if the lands be not of equal value.

EXCHANGERS, are ſuch as return money by bills of exchange. See the articles BILL and EXCHANGE.

EXCHEQUER, in the britiſh juriſprudence, an antient court of record, in which all cauſes concerning the revenues and rights of the crown are heard and determined, and where the crown-revenues are received. It took this name from the cloth that covered the table of the court, which was party-coloured or chequered.

This court is ſaid to have been erected by William the conqueror, its model being taken from a like court eſtabliſhed in Normandy long before that time. Antiently its authority was ſo great, that it was held in the king's palace, and the acts thereof were not be examined or controlled in any other of the king's courts; but, at preſent, it is the laſt of the four courts at Weſtminſter.

In the exchequer, ſome reckon ſeven courts, *viz.* thoſe of pleas, accounts, receipts, exchequer-chamber, (which is an aſſembly of all the judges on difficult matters in law) errors in the exchequer, errors in the king's bench, and, laſtly, the court of equity in the exchequer.

But the exchequer, for diſpatch of buſineſs, is generally divided into two parts; one of which is chiefly converſant in the judicial hearing and deciding of all cauſes relating to the king's coffers, formerly termed the exchequer of accounts: the other is called the receipt of the exchequer, as being principally employed in receiving and payment of money.

Officers of the receipt may take one penny in the pound, as their fee for ſums iſſued out; and they are obliged, without delay, to receive the money brought thither; and the money received is to be put in cheſts under three different locks and keys, kept by three ſeveral officers. All ſheriffs, bailiffs, *&c.* are to account in the exchequer; and in the lower part, termed the receipt, the debtors of the king, and perſons in debt to them, the king's tenants, and the officers and miniſters of the court, are privileged to ſue one another, or any ſtranger, and to be ſued in the like actions as are brought in the courts of king's bench and common-pleas.

The judicial part of the exchequer, is a court both of law and equity. The court of law is held in the office of pleas, according to the courſe of common law, before the barons: in this court, the plaintiff ought to be debtor or accountant to the king; and the leading proceſs is either a writ of ſubpœna, or quo minus, which laſt goes into Wales, where no proceſs out of our courts of law ought to run, except a capias utlagatum.

The court of equity is held in the exchequer-chamber before the treaſurer, chancellor, and barons; but, generally, before the barons only; the lord chief baron being the chief judge to hear and determine all cauſes. The proceedings in this part of the exchequer, are by engliſh bill and anſwer, according to the practice of the court of chancery; with this difference, that the plaintiff here muſt likewiſe ſet forth that he is a debtor to the king, whether he be ſo or not. It is in this court of equity that the clergy exhibit bills for the recovery of their tythes, *&c.* Here too the attorney-general exhibits bills for any matters concerning the crown; and a bill may be exhibited againſt the king's attorney by any perſon aggrieved in any cauſe proſecuted againſt him on behalf of the king, to be relieved therein: in which caſe, the plaintiff is to attend on the attorney-general with

with a copy of the bill, and procure him to give in an anfwer thereto; in the making of which he may call in any perfon interefted in the caufe, or any officer, or others, to inftruct him, that the king be not prejudiced thereby, and his anfwer is to be put in without oath.

But befides the bufinefs relating to debtors, farmers, receivers, accountants, &c. all penal punifhments, intrufion, and forfeitures upon popular actions, are matters likewife cognizable by this court; where there alfo fits a puifne baron, who adminifters the oaths to high fheriffs, bailiffs, auditors, receivers, collectors, controllers, furveyors and fearchers of all the cuftoms, &c. See the articles BARON, CHANCELLOR, &c.

The exchequer in Scotland, has the fame privileges and jurifdiction as that of England; and all matters competent to the one, are likewife competent to the other.

Black book of the EXCHEQUER, a book containing a defcription of the court of England in 1175, and its officers, with their ranks, wages, privileges, perquifites, &c. alfo the revenues of the crown, both in money and cattle.

EXCIPIENT, in pharmacy, denotes the ingredient, which, in compound medicines, receives all the reft; as the conferve in electuaries, the fyrup in bolufes, &c.

EXCISE, a certain duty or impoft charged upon liquors, as beer, ale, cyder, &c. malt, and feveral other commodities, within the kingdom of Great Britain, and town of Berwick upon Tweed.

The excife is one of the moft confiderable branches of the king's revenue. It was formerly farmed out, but is now managed for the king by commiffioners in both kingdoms, who receive the whole product of the excife, and pay it into the exchequer. Thefe commiffioners are nine in number in England, and four in Scotland. The former have a falary of 1000l. a year, the latter, 500 l. They are obliged by oath to take no fee or reward but from the king himfelf; and from thence them lies an appeal to five other commiffioners, called commiffioners of appeals. The duty of excife was firft granted to king Charles II. by act of parliament in the year 1660, during the life of that monarch. 1. It was 15 d. *per* barrel upon every barrel of beer or ale above 6 s. the barrel, and 3 d. *per* barrel for every barrel of 6 s. or under, brewed for retail; 15 d. for every hogfhead of cyder or perry fold by retail, 1 d. for every gallon of ftrong water, aqua vitæ, &c. 2. A new excife was granted for ever by the fifth money act of Will. and Mary, being for every barrel of beer or ale above 6 s. the barrel, 9 d. and for every barrel of 6 s. or under, 3 d. for every hogfhead of cyder or perry, 1 s. *per* hogfhead. In this excife, the price of the liquor is to be reckoned exclufive of the duty. 3. An excife was granted of 6 d. a bufhel on malt in the reign of king William, which by fubfequent ftatutes has been continued yearly ever fince. But fuch malt as fhall be made for exportation, and be fo entered and kept feparate from other malt, is exempted from the payment of this duty. 4. Another new excife upon home-made liquors was granted in queen Anne's reign; being an additional excife upon every barrel of beer or ale brewed for fale above 6 s. the barrel, 3 d. exclufive of the duties; and for every barrel at 6 s. or under, 1 d. for every hogfhead of cyder or perry, 5 d. for every gallon of ftrong waters or aqua vitæ, 1 d. This excife was not laid upon any fuch liquors imported. 5. An excife on candles was firft granted in the reign of queen Anne, and continued for ever, being a duty of 4 d. a pound on wax and a halfpenny the pound on tallow-candles, made in Great Britain for fale or not for fale; but makers for their own ufe may compound for 1 s. a head for every perfon in their family. An additional excife on candles was afterwards granted, being the fame with the former in every refpect. 6. An excife upon hides and fkins tanned in Britain, firft granted in queen Anne's reign, was an excife of feventeen different kinds, upon fo many different kinds of hides and fkins particularly named, and upon all others not named, 13 l. *per cent. ad valorem*. An additional excife was afterwards granted, being an additional duty of different kinds, upon fo many different forts of hides and fkins particularly named, and on all others not named, 15 l. *per cent.* on the value. 7. An excife on home-made vellum and parchment, firft granted by the fame act, being 1 s. *per* dozen on vellum, and 6 d. the dozen on parchment. And afterwards an additional excife on vellum, &c. was granted, being an additional duty of 2 s. the dozen on vellum, and 1 s. the dozen on parchment. 8. An excife on hops of home growth was firft granted in

in queen Anne's reign, being 1 d. *per* pound. 9. An excise on paper, paste-boards, milled boards, and scale-boards, was first granted in the reign of queen Anne, being a duty of eleven different kinds on so many different sorts of paper particularly named, made in Great Britain; on paste-boards, &c. 3 s. the hundred weight, and on all sorts of paper not named, 12 l. *per cent.* on the value. An additional duty on paper, &c. was granted of eleven different kinds, &c. on paste-board, 1 s. 6 d. the hundred weight, and on all sorts of paper not named, 6 l. *per cent.* on the value; and on painted paper for hangings a halfpenny the yard square. 10. An excise of 1 d. *per* pound on soap made in Great Britain, was granted by the same act; to which an additional excise has been added of a halfpenny *per* pound. 11. An excise upon printed silks, callicoes, linens and stuffs made in Great Britain, and printed, painted, stained or dyed here, was first granted in queen Anne's reign, being a duty of 3 d. on silks and callicoes, and 1 ½ d. on linen and stuffs the yard square, excepting silk-handkerchiefs, linens and fustains dyed of one colour, and stuffs made of woollen, or the greatest part in value of woollen. And an additional excise was granted of 6 d. the yard of half-yard broad silks; 1 d. the yard square of silk handkerchiefs; 3 d. the yard square of callicoes, and 1½ d. the yard square of linens and stuffs, excepting, as before, callicoes, &c. dyed of one colour, and woollen stuffs. 12. An excise on starch was first granted for 1 d. the pound; and afterwards an additional excise of 1 d. the pound. 13. The excise on gilt and silver wire made in Great Britain, is 8 d. the ounce on gilt wire, and 6 d. the ounce on silver wire.

If any brewers do not make true entries of their liquors brewed, once a week at the excise office, they forfeit 10 l. but this is subject to mitigation, so as not to be less than double the duty; and the retailers of beer and ale and strong waters, neglecting to make their entries once a month of what liquors they retail, are liable to 40 s. penalty. In case any brewer erects or alters any back, copper, cooler, &c. or keeps a private store-house, or if any malster keeps any private vessel for steeping barley, without giving proper notice to the officers of excise, such brewer or malster forfeit 50 l. and where they bribe a gauger, it is 10 l. The officers of excise may go on board ships, and search for any exciseable liquors, as officers of the customs do, and seize commodities forfeited, &c. and complaints made at the chief office of excise, are to be heard by three or more commissioners; but two justices of the peace have the power to determine, in seizures out of the limits of the excise office in London.

EXCLAMATION, in rhetoric, a figure that expresses the violent and sudden breaking out, and vehemence of any passion. Such is that in the second book of Milton's Paradise Lost.

O unexpected stroke, worse than of death!
Must I thus leave thee, Paradise? Thus leave
Thee, native soil; these happy walks and shades,
Fit haunt of gods!

Other figures are the language of some particular passion, but this expresses them all. It is the voice of nature, when she is in concern and transport.

EXCLUSION, or *Bill of* EXCLUSION, a bill proposed about the close of the reign of king Charles II. for excluding the duke of York, the king's brother, from the throne, on account of his being a papist.

EXCLUSION, in mathematics, is a method of coming at the solution of numerical problems, by previously throwing out of our consideration such numbers as are of no use in solving the question. Mr. Frenicle gives an account of it in the Ouvrages de Mathematique, &c.

EXCLUSIVE is sometimes used adjectively, thus. *A patent carries with it an exclusive privilege*; and sometimes adverbially, as, *he sent him all the numbers from* n° 145 *to* n° 247 *exclusive*; that is, all between these two numbers, which themselves were excepted.

EXCLUSIVE PROPOSITIONS, in logic, are those where the predicate so agrees with its subject, as to exclude every other. Thus, *virtue alone constitutes nobility*, is an exclusive proposition.

EXCOMMUNICATION, an ecclesiastical penalty or censure whereby such persons as are guilty of any notorious crime or offence, are separated from the communion of the church, and deprived of all spiritual advantages.

Excommunication among the Jews, according to Elias, a German rabbin, was distinguished into three kinds, 1. Niddui, which was a separation of but a few days, 2. Cherem, a separation attended with execration and malediction. And, 3. Sham-

ſhammatha, which was the laſt and greater excommunication. But Selden ſays, that niddui and ſhammatha are the ſame thing, and therefore that there were but two kinds of excommunication among the Jews, *viz.* the greater and the leſſer. They made alſo another diſtinction in excommunication, into total or univerſal, by which a man was excommunicated with regard to all men; and partial, by which a man was excommunicated in one city, and with regard to certain perſons, and not others.

It is obſervable, that not only the judges had the power of excommunicating, but that each particular perſon in converſation might excommunicate another, and himſelf likewiſe; and this excommunication, if well grounded, was of force: nay, if a man dreamed that he was excommunicated by himſelf or by another, he was conſidered as an excommunicated perſon, becauſe this dream was ſuppoſed to be ſent from God.

As to the effects of the jewiſh excommunication, the leſſer excluded the excommunicated perſon from the ſociety of men; that is, he was not to come nearer them than four cubits, neither he, his wife, children, or domeſtics, according to Buxtorf. The greater abſolutely ſequeſtered the perſon from the converſation of others; and ſometimes he was ſhut up in a ſmall chamber or priſon, where he lived alone. Baronius and Beza pretend, that the greater excommunication excluded men from the uſe of ſacred things. Selden, on the contrary, affirms, that they were allowed to be preſent in the temple, and partake of the public worſhip. Buxtorf, who is of the ſame opinion, adds, that whereas others came into the temple at the right hand, and went out at the left, the excommunicated were obliged both to go in and out at the left.

Excommunication among the modern Jews, is attended with the moſt terrible conſequences. The excommunicated perſon is refuſed all human aſſiſtance: if there be a corpſe in his houſe, or a child to be circumciſed, none muſt help him. He is curſed by the book of the law, by the curſe of Joſhua againſt Jericho, by that of Eliſha againſt the children, by heaven and earth, and God is beſought that a whirlwind may daſh him to pieces. He is pelted with ſtones if he appear in the ſtreets; and if he obtains abſolution, it is upon the moſt mortifying conditions; for he is publicly tied to a poſt and whipped, after which he lays himſelf down at the door of the ſynagogue, and all thoſe who go out, paſs over him. This was the very caſe of the famous jew Acoſta. See BAYLE in the article Acoſta.

In the antient chriſtian church, the power of excommunication, as well as other acts of eccleſiaſtical diſcipline, was lodged in the hands of the clergy, who diſtinguiſhed it into the greater and leſſer. The leſſer excommunication ſimply called αφορισμος, ſeparation or ſuſpenſion, conſiſted in excluding men from the participation of the euchariſt, and the prayers of the faithful. But they were not expelled the church; for they had the privilege of being preſent at the reading of the ſcriptures, the ſermons, and the prayers of the catechumens and penitents. This excommunication was inflicted for leſſer crimes, ſuch as neglecting to attend the ſervice of the church, miſbehaviour in it, and the like.

The greater excommunication, called παντελης αφορισμος, total ſeparation and anathema, conſiſted in an abſolute and intire excluſion from the church and the participation of all its rites. When any perſon was thus excommunicated, notice were given of it by circular letters to the moſt eminent churches all over the world, that they might all confirm this act of diſcipline, by refuſing to admit the delinquent to their communion. The conſequences of this latter excommunication were very terrible. The excommunicated perſon was avoided in civil commerce and outward converſation. No one was to receive him into his houſe, nor eat at the ſame table with him; and when dead, he was denied the ſolemn rites of burial.

It has been a queſtion, whether the antient church uſed to add execration to her cenſures. Grotius thinks this was done, though very ſeldom, as in the caſe of Julian the apoſtate, for whoſe deſtruction the antient chriſtians abſolutely prayed to God. St. Chryſoſtom was utterly againſt this practice, affirming that we ought not to pray againſt the ſinner, but againſt his opinions or actions.

The romiſh pontifical takes notice of three kinds of excommunication. 1. The minor, incurred by thoſe who have any correſpondence with an excommunicated perſon. 2. The major, which falls upon thoſe who diſobey the commands of the holy ſee, or refuſe to ſubmit to certain points

points of discipline; in consequence of which they are excluded from the church militant and triumphant, and delivered over to the devil and his angels. 3. Anathema, which is properly that pronounced by the pope against heretical princes and countries. In former ages, these papal fulminations were most terrible things; but at present, they are formidable to none but a few petty states of Italy. See ANATHEMA and FULMINATION.

Excommunication in the greek church, cuts the offender off from all communion with the 318 fathers of the first council of Nice, and with the saints; consigns him over to the devil and the traitor Judas; and condemns his body to remain after death as hard as a flint or piece of steel, unless he humbles himself and makes attonement for his sins by a sincere repentance. The form abounds with dreadful imprecations; and the Greeks assert, that if a person dies excommunicated, the devil enters into the lifeless corpse; and therefore in order to prevent it, the relations of the deceased cut his body in pieces, and boil them in wine. It is a custom for the patriarch of Jerusalem annually to excommunicate the pope and the church of Rome; on which occasion, together with a great deal of idle ceremony, he drives a nail into the ground with a hammer, as a mark of malediction.

The form of excommunication in the church of England, antiently ran thus: "By the authority of God the father almighty, the Son and Holy Ghost, and of Mary the blessed mother of God, we excommunicate, anathematize, and sequester from the pale of holy mother-church," *&c.* The causes of excommunication with us, are contempt of the bishop's court, heresy, neglect of public worship and the sacraments, incontinency, adultery, simony, *&c.* It is published in the church, and if the offender does not submit in forty days, the civil magistrate interposes, and the excommunicated person is imprisoned till he submits and obtains absolution. Excommunication disables a person from doing any judicial act, as suing in an action at law, being a witness, *&c.* See EXCOMMUNICATO CAPIENDO, *&c.*

Excommunication, among the pagans, excluded the person from the sacrifices and the temples, and delivered him over to the furies, which was called *exsecrare* and *diris devovere.* When Marcus Crassus set out on his expedition against the Parthians, Atteius, tribune of the people, not being able to prevent him, ran to the gate of the city through which the general was to pass, and setting a chaffing-dish in the middle of the way with fire in it, when Crassus drew near, he threw some perfumes into the chaffing-dish, and pronounced curses against Crassus with great exclamation, and thus excommunicated him.

EXCOMMUNICATO CAPIENDO, a writ issued from the chancery upon the bishop's certifying an excommunication. This writ is directed to the sheriff to take the body of the person excommunicated, and imprison him until he has made satisfaction to the church for the contempt or wrong done. See EXCOMMUNICATION.

In the certificate of an excommunication, the cause is to be particularly expressed, that the judges may see whether the ecclesiastical court has cognizance of the cause; and if the ordinary excommunicate a person for a thing of which he hath no cognizance, the party may bring an action against him, and in some cases may be delivered by habeas corpus, or by prohibition.

EXCOMMUNICATO DELIBERANDO, a writ directed to a sheriff for the delivery of an excommunicated person, upon the bishop's certifying to the king, that he hath conformed to the ecclesiastical jurisdiction.

EXCOMMUNICATO RECIPIENDO, a writ where excommunicated persons being committed to prison, and afterwards illegally delivered, are commanded to be retaken and imprisoned again.

EXCORIATION, in medicine and surgery, the galling or rubbing off of the cuticle, especially of the parts between the thighs, and about the anus.

In adults, it is occasioned by riding, much walking, or other vehement exercise, and may be cured by vulnerary applications. In children, there is often an excoriation not only of the parts near the pudenda, chiefly of the groin and scrotum, but likewise in the wrinkles of the neck, under the arms, and in other places; proceeding from the acrimony of the urine and sweat, and occasioning itching pains, crying, watching, and restlessness.

To remedy this, the parts affected may be washed often with warm water, and sprinkled with drying powders, as chalk, hartshorn, but especially tutty, lapis calaminaris, and ceruss, which may be tied loosely in a rag, and the powder shook out

out on the difordered places. If the parts tend to a real ulceration, it will be proper to add a little fugar of lead to the powder, or to anoint the place with unguent. alb. camphor. Likewife a little white vitriol, diffolved in fpring-water, and daubed upon the part, will dry and heal it very powerfully.

EXCORTICATION, the fame with barking of trees. See the article BARKING.

EXCREMENT, whatever is difcharged out of the body of animals after digeftion, or the fibrous parts of the aliment, mixed with the bile, faliva, and other fluids. Urine and the fæces are the grofs excrements that are difcharged out of the bladder or belly. Other excrements are the various humours that are fecreted from the blood through the various ftrainers in the body, and which ferve for feveral ufes, fuch as the faliva, fweat, bile, the pancreatic juice, lymph, the femen, nails, the hair, the horns and hoofs of animals. The ejection of excrements is an evacution by urine, ftool, fpittle, &c. Unlefs the excretions are regular, health cannot be maintained, and therefore, if they are too plentiful, defective, or fuppreffed, they will occafion various diforders: hence, if a perfon be coftive, it is generally the forerunner of fome difeafe. As a man generally takes more aliment than is neceffary to generate blood and ferum, and the common excretions are not fufficient to carry off fuperfluous humours, extraordinary ones fometimes happen, at ftated times; as the piles, hæmorrhages, &c. See more upon this under the articles DISEASE and EXCRETION.

EXCRESCENCE, in furgery, denotes every preternatural tumour which arifes upon the fkin, either in the form of a wart or tubercle. If they are born with a perfon, as they frequently are, they are called *nævi materni*, or marks from the mother; but if the tumour is large, fo as to depend from the fkin like a flefhy mafs, it is then called a farcoma.

Excrefcences arife in all parts of the body, but more efpecially the head, face, eye-brows, neck, breaft, abdomen, anus, legs, and arms. Their fize and figure are various; with regard to their colour, fome refemble that of the fkin, others are inclined to black or red; and, with refpect to their figure, they refemble ftrawberries, mulberries, grapes, figs, pears, mice, and the like.

As to the general treatment of them, they may be removed either by ligature, the knife, or actual and potential cauteries, according as the patient's habit of body and other circumftances may require. However, it is to be obferved, that if thefe excrefcences have a very large root, if there are large arteries or veins near the root, or if it be firmly joined to the bone, in thefe cafes, the furgeon fhould remove them with great caution; or, in cafes of great danger, wholly neglect them. When thefe tumours lie near large blood-veffels, it is proper to have ftyptics, bandages, and often actual cauteries in readinefs to ftop the hæmorrhage, efpecially if they are removed by abfciffion.

EXCRETION, or SECRETION, in medicine, a feparation of fome fluid, mixed with the blood, by means of the glands. Excretions, by which we mean thofe that evacuate fuperfluous and heterogeneous humours, purify the mafs of blood: the humours which are generated in the blood are excreted by the glands, and are replaced by a fufficient quantity of aliment. This, in adults, keeps the body of an equal weight, and confequently preferves life and health: therefore the fecretions ought neither to be difturbed or diminifhed, fuppreffed or increafed: the extraordinary excretions, fuch as the bleeding piles, and hæmorrhages of the nofe, alfo large fweats, loofenefs, running at the nofe, coughs, catarrhs, plentiful fpitting, all promote health; and if thefe are defective or fuppreffed, dangerous difeafes may arife: wherefore it is highly hazardous to fupprefs fecretions of this kind. See the article EXCREMENT.

EXCRETORY, in anatomy, a term applied to certain little ducts or veffels, deftined for the reception of a fluid, fecreted in certain glandules, and other vifcera, for the excretion of it in the appropriated places. See the preceding article.

All the glands are ufually furnifhed with an excretory duct. See GLAND.

EXCURSION, in aftronomy, is ufed in a fynonymous fenfe with elongation. See the article ELONGATION.

Circles of EXCURSION. See the preceding article.

EXCUTIA *Ventriculi*, the ftomach brufh, a name given, by modern furgeons, to an inftrument made of foft briftles, formed into a bundle, and fixed upon a flexible brafs wire, for cleanfing the throat, or even the ftomach. The ftomach brufh is compofed of foft hair faftened together into a bundle by a twifted brafs or

steel wire, and the handle or stem of it is invested with silk. This has been greatly recommended, by some, to remove foreign bodies out of the fauces and oesophagus; and, to scower the stomach. The method of using it is this: The patient is first to drink a small draught of warm water, then the brush is to be received into the oesophagus, and gently protruded down into the stomach, by twisting round and round its handle, and, when in the stomach, it is to be drawn up and down many times, like the sucker in a syringe, and at length wholly extracted. The advantages said to arise from this, are very great, such as the prolonging life to a great age, and the like; but few people have been willing to try the effects of so disagreeable and troublesome an operation. Wedelius and Teichmeir have written express treatises on this instrument, and one of them has attempted to prove it no new contrivance, but a thing very early known, described, and used in physic.

EXECRATION, *execratio*, in antiquity, a kind of punishment, consisting of direful curses and marks of infamy: such was that used against Philip king of Macedon, by the Athenians. A general assembly of the people being called, they made a decree, that all the statues and images of that king, and of all his ancestors, should be demolished, and their very names razed; that all the festivals, sacred rites, priests, and whatever else had been instituted in honour of him, should be prophaned; that the very places where there had been any monument or inscription to his honour, should be detestable; that nothing should be set up or dedicated in them, which could be done in clean places: and, lastly, that the priests, as often as they prayed for the athenian people, allies, armies, and fleets, should as many times detest and execrate Philip, his children, kingdom, land and sea forces, and the whole race and name of the Macedonians.

At the taking and demolishing a city, it was frequent to pronounce dreadful curses and execrations upon whoever should endeavour to rebuild it; which some imagine was the reason that Troy could never be raised out of its ashes, though several persons attempted it, being devoted to eternal and irreparable ruin by Agamemnon. We find Joshua at the destruction of Jericho, fix an imprecation upon the person who should endeavour to rebuild it, which was accomplished in Hiel the Bethelite, many ages after.

EXECUTION, in a general sense, the act of accomplishing, finishing, or atchieving any thing to be done.

EXECUTION, in law, the compleating or finishing some act, as of judgment, deed, &c. and it usually signifies the obtaining possession of any thing received by judgment of law. See JUDGMENT.

Sir Edward Coke observes, that there are two sorts of executions: the one final, and the other a quousque, that tends to an end. An execution final, is that which makes money of the defendant's goods, or extends to his lands, and delivers them to the plaintiff, who accepts the same in satisfaction; and this is the end of the suit, and the whole that the king's writ requires to be done. The writ or execution with a quousque, though it tends to an end, yet is not final, as in the case of a capias ad satisfac. where the defendant's body is to be taken, in order that the plaintiff may be satisfied for his debt. See the article CAPIAS.

Executions are either in personal, real, or mixed actions. In a personal action, the execution may be made three ways, *viz.* by the writ of capias ad satisfaciendam, against the body of the defendant; fieri facias, against his goods; or elegit, against his lands. See the article FIERI FACIAS and ELEGIT.

In a real and mixed action, the execution is by writ of habere facias seisinam, and habere possessionem. See HABERE.

Writs of execution bind the property of goods only from the time of delivery of the writ to the sheriff; but the land is bound from the day of the judgment obtained: and here the sale of any goods for valuable consideration, after a judgment, and before the execution awarded, will be good. It is otherwise as to lands, of which execution may be made, even on a purchase after the judgment, though the defendant sell such land before execution. Likewise, sheriffs may deliver in execution all the lands whereof others shall be seised in trust for him, against whom execution is had on a judgment, &c.

When any judgment is signed, the execution may be taken out immediately thereon; but if it be not issued within a year and a day after, where there is no fault in the defendant, as in the case of an injunction, writ of error, &c. there must a scire facias to revive the judgment; though,

though, if the plaintiff ſues out any writ of execution within the year, he may continue it after the year is expired. After judgment againſt the defendant, in an action wherein ſpecial bail is given, the plaintiff is at liberty to have execution againſt ſuch defendant, or againſt his bail: but this is underſtood where the defendant does not render himſelf, according to law, in ſafeguard of the bail: and execution may not regularly be ſued forth againſt a bail, till a default is returned againſt the principal: alſo, if the plaintiff takes the bail, he ſhall never take the principal. It is held that an execution may be executed after the death of the defendant; for his executor, being privy thereto, is liable, as well as the teſtator. The execution is an entire thing, ſo that he who begins muſt end it: therefore, a new ſheriff may diſtrain an old one, to ſell the goods ſeiſed on a diſtringas, and to bring the money into court.

EXECUTION *of judgment*, in criminal caſes. This muſt be purſuant to the judgment, and the king may not alter it, for this reaſon, that no execution can be warranted by law, but where it is according to the judgment given; yet the king may pardon part of the execution in judgment for treaſon, *viz.* all but beheading.

The execution of criminals is to be made by the proper officer; and if the ſheriff, or other officer impowered to do it, alters the execution, or any other executes an offender, or if he be killed without authority of law, it is felony. Where a perſon condemned to die comes to life after he is hanged; in this caſe, as the judgment is not executed till he is dead, he ought to be hung up again. And the bodies of felons are forfeited to the king by the execution, who may diſpoſe of them as he pleaſes.

Military EXECUTION, the pillaging or plundering of a country, by the enemy's army.

EXECUTIONE FACIENDA, a writ that iſſues for the execution of a judgment, and is uſed in divers caſes. See the articles EXECUTION and JUDGMENT.

EXECUTIONE FACIENDA IN WITHERNAMIUM, a writ which lies for taking a perſon's cattle, who has conveyed the cattle of another out of the country, ſo that the ſheriff is not able to replevy them.

EXECUTIONE JUDICII, a writ directed to the judge of an inferior court, commanding him to execute a judgment therein, or to return reaſonable cauſe why he delays the execution.

If on this writ execution be not done, or ſome reaſonable cauſe ſhewn why it is delayed, an alias ſhall iſſue, and afterwards a pluries, &c. And if on this laſt writ execution is not done, or ſome reaſonable cauſe returned for its being ſo delayed, the party ſhall have an attachment againſt him who delays the ſame, and the attachment is made returnable in the king's bench or common pleas.

EXECUTOR, in law, a perſon appointed by another's laſt will and teſtament, to have the execution of the ſame after his deceaſe, and the diſpoſing of the teſtator's goods and effects, according to the intent of the will.

The law accounts an executor one perſon with the party whoſe executor he is; having all the advantages of action, and being ſubject to the ſame actions as the deceaſed.

Hence as an executor derives his power wholly from the will, he may releaſe a debt, or do any thing as executor, before probate of the will, provided he afterwards proves it: however, to maintain actions for debts, he muſt ſhew the teſtament proved. He may immediately take the goods, or give power to another to ſeize them for him.

A perſon capable of making an executor, either makes one, two, three, or more; and he may appoint, that one ſhall be his executor for one year, and another for another. If he appoints executors only for a certain number of years, after they are elapſed, the ordinary may grant adminiſtration of the goods; as he may do, till the power of executors take place. It is alſo obſervable, that where there is no executor, there is properly no will; and where there is no will, there can be no executors: but this only regards goods; for where lands in fee are deviſed, it is a good will, though no executors be named therein.

An executor may either accept or refuſe the executorſhip; but after he has accepted the office, he ſhall not refuſe the ſame, nor take it up after refuſal. If any one of ſeveral executors prove the will, it will ſerve for all; ſo that the reſt may at any time after join with him, and intermeddle with the eſtate. When any action is brought, it muſt be in the names of all the executors, notwithſtanding ſome of them may not act; but in any action commenced againſt them, he only that admi-

adminifters is to be fued. The poffeffion of one executor, is held to be poffeffion of them all; and moft acts done by or to one, are deemed done by or to all of them.

The particular duty of an executor, is to bury the teftator in a decent manner, according to his rank and circumftances, and with a due regard to the eftate left; for whatever the executor lays out in funeral charges extravagantly, if there be not enough to pay debts, he muft bear it at his own expence. He is to make an inventory of all the goods and chattels of the deceafed, with their value; and then, or before, if requifite, where there is enough to pay the teftator's debts and legacies, he ought to prove the will before the ordinary in common form, either by his own oath, or by witneffes, if required by thofe who have a right to queftion it: and when exhibited in the regifter's office of the ecclefiaftical court, a copy thereof in parchment is delivered to the executor under the ordinary's feal, which is called the probate.

The executor is next to pay all debts, before legacies, in the order following, *viz.* the charges of the funeral being firft paid, the king's debt is to be preferred before all others; then debts on judgments, and ftatutes and recognizances, thofe due upon mortgages, bonds, and other fpecialities; after them, rent on leafes, fervants wages, debts on notes, and fhop-books: for if he pays the debts in any other order, he is liable to the payment of debts of a higher degree, though out of his own eftate; yet, among debts of equal degree, an executor may pay himfelf firft: and fuch as are firft fued for, fhall be firft paid; and if no fuit be commenced, he may pay the whole debt to any one creditor, although there fhould be nothing left to pay another any part of his. In cafe the teftator is bound in feveral bonds, his executors has the privilege to pay which bond he pleafes, unlefs an action of debt is actually profecuted againft him upon fome of the other bonds; and in fuch a cafe, if while an action of this kind is depending, another bond-creditor brings another action, before any judgment is obtained, he may prefer which he will by confeffing a judgment to one, and paying him; which judgment may be pleaded in bar to the other action.

After the debts, an executor is to pay the legacies; and he may prefer a legacy to himfelf, though there fhould not be enough to pay any of the reft. He may likewife pay what legacies he pleafes firft, or give to each legatee a part, in proportion, if there is not enough to pay the whole. However, if there be a fpecific legacy of fome particular thing, as a horfe, or filver-cup, it muft be delivered before any other legacy.

In cafe an executor pays out the affets in legacies, and afterwards debts appear, of which he had no notice, which he is obliged to pay; he may, by a bill in chancery, compel the legatees to refund.

After the debts and legacies are paid, whatever remains, it is faid, belongs to the executor by the common law; but this has been conftrued, where the executor is a relation of the deceafed, and had no legacy or other provifion by the will. Hence, where a perfon made a will, and an executor, without difpofing of the refidue of his perfonal eftate, it has been adjudged, that the remainder fhould not go to the executor, but be diftributed among the relations of the teftator by adminiftration.

EXECUTOR DE SON TORT, or an executor of his own wrong, a perfon that takes upon him the office of an executor by intrufion, without being fo conftituted by the teftator, or appointed by the ordinary to adminifter. Such a perfon is chargeable to the rightful executor, as alfo to all the teftator's creditors and legatees, fo far as the goods amount to which he wrongfully poffeffed.

EXECUTORY, in law, is where an eftate in fee, that is made by deed or fine, is to be executed afterwards by entry, livery or writ. Leafes for years, annuities, conditions, *&c.* are termed inheritances executory.

EXECUTORY DEVISE, is when the fee by devife is vefted in any perfon, that is to be vefted in another upon contingency. In all cafes of executory devifes, the eftates defcend until the contingencies happen. The remainder of a fee may not be limited by the rules of law after a fee fimple, unlefs fuch eftate depends upon a contingency or is conditional, when it may take place as an executory devife. Executory devifes of terms for years, ought to arife within the compafs of one life.

EXEDRÆ, in antiquity, a general name for fuch buildings as were diftinct from the main body of the churches, and yet within the limits of the church taken in its

its largeft fenfe. Among the expdræ the chief was the baptiftery. See the article BAPTISTERY.

Expedræ were alfo halls or little academies with feveral feats, upon which philofophers rhetoricians, &c. fat, when they met for converfation or difputation. Vitruvius fpeaks of them as places very open and expofed to the fun.

EXEGESIS, a difcourfe by way of explanation or comment upon any fubject. In the Scotch univerfities, there is an exercife among the ftudents in divinity called an exegefis, in which a queftion is ftated by the refpondent, who is then oppofed by two or three other ftudents in their turns; during which time the profeffor moderates, and folves the difficulties which the refpondent cannot overcome.

EXEGETICA, a term ufed by fome for the method of extracting the roots of equations. See the articles EXTRACTION, and EQUATION.

EXEMPLAR, denotes much the fame with model. See the article MODEL.

EXEMPLIFICATION *of letters patent*, a tranfcript or duplicate of them, made from the inrollment thereof, and fealed with the great feal.

Thefe exemplifications are by ftatute equally effectual, and may be pleaded as well as the originals. One may exemplify a patent under the great feal in chancery; alfo any record, or judgment, in any of the courts at Weftminfter, under the feal of each court; which exemplifications may be given in evidence to a jury. It is held that nothing but matter of record ought to be exemplified.

EXEMPLIFICATIONE, in law, a writ granted for the exemplification of any original record. See the articles EXEMPLIFICATION and RECORD.

EXEMPTION, in law, a privilege to be free from fome fervice or appearance: thus, barons and peers of the realm are, on account of their dignity, exempted from being fworn upon inquefts; and knights, clergymen, and others, from appearing at the fheriff's turn. Perfons of feventy years of age, apothecaries, &c. are alfo by law exempted from ferving on juries; and juftices of the peace, attornies, &c. from parifh-offices.

EXEMPTION, in the church of Rome, a privilege granted by the pope to the clergy, and fometimes to the laity, to exempt or free them from the jurifdiction of their refpective ordinaries. Thus monafteries, and even private priefts, for a fmall charge, formerly procured exemptions from the jurifdiction of their bifhops. In this, however, the council of Trent made a fmall reformation, by abolifhing the exemption of particular priefts, and monks not living in cloyfters, and that of chapters in criminal matters.

EXERCISE, among phyficians, fuch an agitation of the body as produces falutary effects in the animal œconomy.

Exercife may be faid to be either active or paffive. The active is walking, hunting, dancing, playing at bowls, and the like; as alfo fpeaking, and other labour of the body and mind. The paffive is riding in a coach, on horfeback, or in any other manner. Exercife may be continued to a beginning of wearinefs, and ought to be ufed before dinner, in a pure light air; for which reafon, journeys and going into the country contribute greatly to preferve and re-eftablifh health.

Exercife increafes the circulation of the blood, attenuates and divides the fluids, and promotes a regular perfpiration, as well as a due fecretion of all the humours; for it accelerates the animal fpirits, and facilitates their diftribution into all the fibres of the body, ftrengthens the parts, creates an appetite; and helps digeftion. Whence it arifes, that thofe who accuftom themfelves to exercife are generally very robuft, and feldom fubject to difeafes.

Boerhaave recommends all bodily exercifes in difeafes of a weak and lax fibre. By riding on horfeback, fays his commentator, the pendulous vifcera of the abdomen are fhaken every moment, and gently rubbed as it were one againft another, while in the mean time the pure air acts on the lungs with a greater force. But it is to be obferved, that a weak man fhould not ride on a full ftomach, but either before dinner, or after the digeftion is near finifhed; for when the ftomach is diftended, weak people do not bear thefe concuffions of the horfe, without difficulty; but when the primæ viæ are near empty, the remaining fæces are difcharged by this concuffion. Sailing in a fhip is alfo an exercife of great ufe to weak people. If the veffel moves with an even motion, by increafing perfpiration it ufually excites a wonderful alacrity, creates an appetite, and promotes digeftion. Thefe exercifes are more efpecially ferviceable

to

to weak people; but in order to corroborate the body by mufcular motion, walking, running, and bodily exercifes are to be ufed. In thefe we fhould begin with the moft gentle, fuch as walking, and increafe it by degrees till we come to running. Thofe exercifes of the body are more efpecially ferviceable which give delight to the mind at the fame time, as tennis, fencing, *&c.* for which reafon the wifdom of antiquity appointed rewards for thofe who excelled in thefe gymnaftic exercifes, that by this means the bodies of their youth might be hardened for warlike toils. See the article GYMNASTICS.

As nothing is more conducive to health than moderate exercife, fo violent exercife diffipates the fpirits, weakens the body, deftroys the elafticity of the fibres, and exhaufts the fluid parts of the blood. No wonder then, that acute and mortal fevers often arife from too violent exercife of the body; for the motion of the venal blood towards the heart being quickened by the contraction of the mufcles, and the veins being thus depleted, the arteries more eafily propel their contained humours through the fmalleft extremities into the now lefs refifting veins, and therefore the velocity of the circulation will be increafed thro' all the veffels. But this cannot be performed without applying the humors oftener, or in a greater quantity to the fecretory organs in the fame time, whence the more fluid parts of the blood will be diffipated, what remains will be infpiffated, and by the greater action of the veffels upon their contained fluids, and of the reacting fluids upon the veffels, the blood acquires an inflammatory denfity. Add to this, that by the violent attrition of the folids and fluids, together with the heat thence arifing, all the humours will incline to a greater acrimony, and the falts and oils of the blood will become more acrid and volatile. Hence, fays Boerhaave, thofe fevers which arife from too much exercife or motion, are cured by reft of body and mind, with fuch aliments and medicines as moiften, dilate, and foften, or allay acrimony.

The exercife of a foldier in camp, confidered as conducive to health, Dr. Pringle diftinguifhes into three heads, the firft relating to his duty, the fecond to his living more commodioufly, and the third to his diverfions. The firft confifting chiefly in the exercife of his arms, will be no lefs the means of preferving health, than of making him expert in his duty, and frequent returns of this early, and before the fun grows hot, will be made more advantageous than repeating it feldom, and ftaying out long at a time; for a camp affording little convenience for refrefhment, all unneceffary fatigue is to be avoided. As to the fecond article, cutting boughs for fhading the tents, making trenches round them for carrying off the water, airing the ftraw, cleaning their cloths and accoutrements, and affifting in the bufinefs of the mefs, ought to be no difagreeable exercife to the men for fome part of the day. Laftly, as to diverfions, the men muft be encouraged to them either by the expmple of their officers, or by fmall premiums to thofe who fhall excel in any kind of fports, as fhall be judged moft conducive to health; but herein great caution is neceffary not to allow them to fatigue themfelves too much, efpecially in hot weather, or fickly times; but above all, that their cloaths be kept dry, wet cloaths being the moft frequent caufes of camp difeafes.

EXERCISE, in military affairs, is the ranging a body of foldiers in form of battle, and making them perform the feveral motions and military evolutions with different management of their arms, in order to make them expert therein.

EXERCISES are alfo underftood of what young gentlemen learn in the academies and riding fchools, fuch as fencing, dancing, riding the great horfe, *&c.*

EXERGUM, among antiquarians, a little fpace around or without the figures of a medal, left for the infcription, cypher, device, date, *&c.*

EXETER, the capital city of Devonfhire, fituated on the river Ex, ten miles north of the britifh channel: weft long. 3° 40′, north lat. 50° 44′.

It is a bifhop's fee, fends two members to parliament, and gives the title of earl to a branch of the noble family of Cecil.

EXFOLIATION, a term ufed by furgeons for the fcaling of a bone, or its rifing and feparating into thin laminæ or fcales.

EXFOLIATIVE TREPAN, one for raifing the flakes or fcales of a bone, one after another. See the article TREPAN.

EX GRAVI QUERELA, in law, is a writ, that lies for the perfon to whom any lands

lands or tenements in fee are devifed by will, and the heir of the devifor enters thereon, and detains them from the devifee. Alfo, where a perfon devifes fuch lands to another in tail with the remainder over in fee: here if the tenant in tail enter, and is feifed by force of the intail, and afterwards he dies without iffue; the perfon in remainder, or reverfion, may bring this writ to execute the devife. See the article DEVISE.

EXHALATION, a general term for all effluvia or fteams raifed from the furface of the earth, in form of vapour. See the articles VAPOUR and EFFLUVIUM.

Some, indeed, diftinguifh exhalations from vapours; expreffing by the former, all ftreams emitted from folid bodies, as earth, fire, fulphur, falts, minerals, &c. and by the latter, the fteams raifed from water, and other fluids. Exhalations, therefore, according to them, are dry, fubtile corpufcles, or effluvia, which are loofened and freed from hard earthy bodies, either by the heat of the fun, the agitation of the air, or the like caufes; and being blended in the atmofphere with the moift vapours, help to conftitute or form clouds and meteors, See the article CLOUD, &c.

Nitrous and fulphureous exhalations are the chief matters of which thunder, lightning, and other meteors are generated in the air. True air is alfo generated by, or rather fet at liberty along with, thefe exhalations, which it ferves to buoy up in the atmofphere. See the articles AIR and ATMOSPHERE.

Mr. Boyle informs us, that the exhalations from mines are hot; as are thofe afcending from fome wells. See the article DAMPS, &c.

EXHAUSTED RECEIVER, a glafs, or other veffel, out of which the air hath been drawn by means of the air-pump. See the article AIR-PUMP.

EXHAUSTION, in mathematics, a method in frequent ufe among the antient mathematicians, as Euclid, Archimedes, &c. that proves the equality of two magnitudes, by a deduction ad abfurdum, in fuppofing that, if one be greater or lefs than the other, there would follow an abfurdity.

This is founded upon what Euclid faith in his tenth book, *viz.* "That thofe "quantities, whofe difference is lefs "than any affignable one, are equal." For if they were unequal, be the difference never fo fmall, yet, it may be fo multiplied, as to become greater than either of them: if not fo, then it is really nothing. This he affumes in the proof of the 1ft propofition of book 10, which is, "That if from the greater of "two quantities, you take more than "its half, and from the remainder "more than its half, and fo continually, "there will, at length, remain a quan- "tity lefs than either of thofe pro- "pofed."

On this foundation they demonftrate, that if a regular polygon of infinite fides be infcribed in, or circumfcribed about, a circle; the fpace that is the difference between the circle and the polygon will, by degrees, be quite exhaufted, and the circle be equal to the polygon.

EXHEREDATION, *exhæridatio*, in the civil law, the exclufion of a fon by the father from inheriting his eftate; termed, among us, difinheriting.

EXHIBIT, in law, is where a deed, or other writing, being produced in a chancery fuit, to be proved by witneffes, the examiner, or commiffioner appointed after the examination of any fuch, certifies on the back of the deed, or writing, that the fame was fhewn to the witnefs, at the time of his examination, and by him fworn to.

EXHIBITION, a benefaction fettled for the benefit of fcholars in the univerfities, that are not on the foundation.

EXHIBITION was antiently an allowance for meat and drink, fuch as the religious appropriators made to the poor depending vicar.

EXHORTATION, in rhetoric, differs only from fuafion, as being more directly addreffed to the paffions.

EXHUMATION, the digging up of a body interred in holy ground, by the authority of a judge. By the French law the exhumation of a dead body is ordered, upon proof that he was killed in a duel; and a parfon may demand the exhumation of any of his parifhioners, when interred out of the parifh, without his confent.

EXIGENT, in law, a writ which lies where the defendant in a perfonal action cannot be found, nor any effects of his within the county, by which he may be attached or diftrained.

This writ is directed to the fheriff, to proclaim and call the defendant five county-court days, one after another, charging him to appear under the pain of outlawry. Where a perfon indicted

dicted of felony, &c. absents himself so long, that the writ of exigent is awarded against him, such a withdrawing will be deemed a flight in law, whereby he is liable to forfeit his goods, and though he afterwards renders himself on the exigent, and is found not guilty, 'tis said the forfeiture shall stand: but if the party was in prison, or beyond the seas, he, or his executors, may reverse the award of the exigent, by writ of error. Upon all exigents, a proclamation shall be issued out to make proclamations in the county where the defendant dwells, for him to yield himself, &c.

EXIGENTERS, four officers in the court of Common Pleas, who make all exigents and proclamations, in all actions where process of outlawry lies. Writs of supersedeas, as well as the prothonotaries upon exigents, are likewise drawn up in their office.

EXILE, the same with banishment. See the article BANISHMENT.

EXILIUM, in law, signifies a spoiling; but seems to be restrained to the injury done to tenants by altering their tenure, ejecting them, &c.

EXILLES, a strong fortress on the frontiers of Dauphine and Piedmont, about ten miles west of Susa, and twenty-five north-west of Turin: east long. 7°, north lat. 45° 5′.

EXISTENCE, that whereby any thing has an actual essence, or is said to be. See the article ESSENCE.

Mr. Locke says, that we arrive at the knowlege of our own existence, by intuition; of the existence of God, by demonstration; and of other things, by sensation. As for our own existence, continues that great philosopher, we perceive it so plainly, that it neither needs, nor is capable of, any proof. I think, I reason, I feel pleasure and pain; can any of these be more evident to me than my own existence? If I doubt of all other things, that very doubt makes me perceive my own existence, and will not suffer me to doubt it. If I know I doubt, I have as certain a perception of the thing doubting, as of that thought which I call doubt: experience then convinces us, that we have an intuitive knowlege of our own existence.

From the knowlege of our own existence, Mr. Locke deduces his demonstration of the existence of a God. See the article GOD.

It has been a subject of great dispute whether external bodies have any existence but in the mind, that is, whether they really exist, or exist in idea only: the former opinion is supported by Mr. Locke, and the latter by Dr. Berkley. The knowledge of the existence of other things, or things without the mind, we have only by sensation: for there being no necessary connection of real existence with any idea a man hath in his memory, nor of any other existence, but that of God, with the existence of any particular man; no particular man can know the existence of any other being but only, when, by operating upon him, it makes itself be perceived by him. The having the idea of any thing in our mind no more proves the existence of that thing, than the picture of a man evidences his being in the world; or the visions of a dream make a true history. It is therefore the actual receiving of ideas from without, that gives us notice of the existence of other things, and makes us know that something does exist at that time without us, which causes that idea in us, though perhaps we neither know nor consider how it does it. This notice, which we have by our senses of the existence of things without us, though it be not altogether so certain as intuition and demonstration, yet deserves the name of knowlege, if we persuade ourselves that our faculties act, and inform us right concerning the existence of those objects that affect them: but besides the assurance we have from our senses themselves, that they do not err in the information they give us of the existence of things without us, we have other concurrent reasons; as, first, It is plain these perceptions are produced in us by external causes affecting our senses, because those that want the organs of any sense never can have the ideas belonging to that sense produced in their minds. Secondly, because we find sometimes that we cannot avoid the having those ideas produced in our minds. When my eyes are shut, I can, at pleasure, recal to my mind the ideas of light, or the sun, which former sensations had lodged in my memory; but if I turn my eyes towards the sun, I cannot avoid the ideas which the light or the sun then produces in me; which shews a manifest difference between those ideas laid up in the memory, and such as force themselves upon us, and we cannot avoid having: besides,

ſides, there is nobody who doth not perceive the difference in himſelf between actually looking on the ſun, and contemplating the idea he has of it in his memory; and therefore he hath certain knowlege that they are not both memory or fancy. Thirdly, add to this, that many ideas are produced in us with pain, which we afterwards remember without the leaſt offence: thus the pain of heat, or cold, when the idea of it is revived in our minds, give us no diſturbance, which when felt, was very troubleſome; and we remember the pain of hunger, thirſt, head-ach, *&c.* without any pain at all, which would either never diſturb us, or elſe conſtantly do it, as often as we thought of it, were there no more but ideas floating in our minds, and appearances entertaining our fancies, without the real exiſtence of things affecting us from abroad. Fourthly, our ſenſes in many caſes bear witneſs to the truth of each others report concerning the exiſtence of ſenſible things without us: he that doubts when he ſees a fire, whether it be real, may, if he pleaſes, feel it too, and by the exquiſite pain, may be convinced that it is not a bare idea, or phantom. *Locke.*

Dr. Berkeley on the other hand contends, that external bodies have no exiſtence but in the mind perceiving them; or that they exiſt no longer, than they are perceived: his principal arguments, which ſeveral others, as well as himſelf, eſteem a demonſtration of this ſyſtem, are as follow. That neither our thoughts, paſſions, or ideas formed by the imagination, exiſt without the mind, is allowed; and that the various ſenſations impreſſed on the mind, whatever objects they compoſe, cannot exiſt otherwiſe than in a mind perceiving them, is equally evident. This appears from the meaning of the term exiſt, when applied to ſenſible things: thus, the table I write on, exiſts, *i. e.* I ſee and feel it; and were I out of my ſtudy, I ſhould ſay it exiſted, *i. e.* that were I in my ſtudy, I ſhould ſee and feel it as before. There was an odour, *i. e.* I ſmelt it, *&c.* but the exiſtence of unthinking beings without any relation to their being perceived is unintelligible: their *eſſe* is *percipi.* Then to ſhew that the notion of bodies is grounded on the doctrine of abſtract ideas, What, he aſks, are light and colours, heat and cold, extenſion and figure, in a word, the things we ſee and feel, but ſo many ſenſations, notions, ideas, or impreſſions on the ſenſe; and is it poſſible to ſeparate, even in thought, any of theſe from perception? The ſeveral bodies then, that compoſe the frame of the world, have not any ſubſiſtence without a mind: their *eſſe* is to be perceived or known; and if they are not perceived by me, nor by any other thinking being, they have no ſhadow of exiſtence at all: the things we perceive are colour, figure, motion, *&c.* that is, the ideas of thoſe things; but has an idea any exiſtence out of the mind? To have an idea is the ſame thing as to perceive; that, therefore, wherein colour, figure, *&c.* exiſt, muſt perceive them. It is evident, therefore, that there can be no unthinking ſubſtance, or ſubſtratum of thoſe ideas. But you may argue, if the ideas themſelves do not exiſt without the mind, there may be things like them, whereof they are copies or reſemblances, which exiſt without the mind. It is anſwered, an idea can be like nothing but an idea, a colour or figure can be nothing elſe but another colour or figure. It may be farther aſked, whether thoſe ſuppoſed original or external things, whereof our ideas are the pictures, be themſelves perceivable or not? If they be not, I appeal to any one whether it be ſenſe to ſay, a colour is like ſomewhat which is inviſible; hard or ſoft, like ſomewhat untangible, *&c.* Some diſtinguiſh between primary and ſecondary qualities, the former, *viz.* extenſion, ſolidity, figure, motion, reſt, and number, have a real exiſtence out of the mind; for the latter, under which come all other ſenſible qualities, as colours, ſounds, taſtes, *&c.* they allow the ideas we have of them are not reſemblances of any thing without the mind, or unperceived, but depend on the ſize, texture, motion, *&c.* of the minute particles of matter. Now it is certain, that thoſe primary qualities are inſeparably united with the other ſecondary ones, and cannot even in thought be abſtracted from them; and, therefore, muſt only exiſt in the mind. Again, great or ſmall, ſwift or ſlow, are allowed to exiſt no where without the mind, being merely relative, and changing, as the frame or poſition of the organ changes: the extenſion, therefore, that exiſts without the mind, is neither great nor ſmall; the motion, neither ſwift nor ſlow, *i. e.* they are nothing. That number is a creature of the mind is

is plain (even though the other qualities were allowed to exift) from this, that the fame thing bears a different denomination of number as the mind views it with different refpects: thus the fame extenfion is 1, 3, or 36, as the mind confiders it, with reference to a yard, a foot, or an inch.

In effect, after the fame manner, as the modern philofophers prove colours, taftes, &c. to have no exiftence in matter, or without the mind, the fame thing may be proved of all fenfible qualities whatever: thus they fay, heat and cold are only the affections of the mind, not at all patterns of real beings exifting in corporeal fubftances, for that the fame body which feems cold to one hand feems warm to another. Now why may we not as well argue that figure and extenfion are not patterns or refemblances of qualities exifting in matter, becaufe, to the fame eye, at different ftations, or to eyes of different ftructure, at the fame ftation, they appear various. Again, fweetnefs, it is proved, does not exift in the thing fapid, becaufe the thing remaining unaltered, the fweetnefs is changed to bitternefs, as in a fever, or by an otherwife vitiated palate. Is it not as reafonable to fay, that motion does not exift out of the mind; fince if the fucceffion of ideas in the mind become finifter, the motion, it is acknowledged, will appear flower, without any external alteration. Again, were it poffible for folid figured bodies to exift out of the mind, yet it were impoffible for us ever to know it: our fenfes, indeed, give us fenfations of ideas, but do not tell us that any thing exifts without the mind, or unperceived, like thofe which are perceived; this the materialifts allow. No other way, therefore, remains, but that we know them by reafon's inferring their exiftence from what is immediately perceived by fenfe: but how fhould reafon do this, when it is confeffed there is not any neceffary connection between our fenfations and thefe bodies. It is evident from the phænomena of dreams, phrenfies, &c. that we may be affected with the ideas we now have, though there were no bodies exifting without them; nor does the fuppofition of external bodies at all forward us in conceiving how our ideas fhould come to be produced.

As to the exiftence of fpirits, Mr. Locke fays, that our having ideas of them does not make us know that any fuch things do exift without us, or that there are any finite fpirits, or any other fpiritual beings but the eternal God. We have ground from revelation, and feveral other reafons, to believe with affurance that there are fuch creatures; but our fenfes not being able to difcover them, we want the means of knowing their particular exiftence; for we can no more know that there are finite fpirits really exifting by the idea we have of fuch beings, than by the ideas any one has of fairies or centaurs, he can come to know that things anfwering thofe ideas do really exift.

EXIT, *exitus*, in law, properly fignifies iffue or offspring; but is alfo applied to iffues, annual rents, and profits of lands.

EXIT, in a theatrical fenfe, the action of a player in going off the ftage, after he has played his part.

To do this with propriety, or in a manner fuitable to the occafion, is by no means the leaft difficult part of a player's office.

EXLEGALITUS, among lawyers, the fame with an outlawed perfon. See the article OUTLAW.

EX MERO MOTU, a formula ufed in the king's charters and letters patent, fignifying that he grants them of his own will and motion.

It is intended to bar all exceptions that might be taken to the charter or patent, by alledging the king, in granting them, was abufed by falfe fuggeftions.

EXOCATACOELI, in church hiftory, a general name by which feveral great officers in the church of Conftantinople were called, as the grand mafter of the chapel, the grand fteward, &c.

They were of great authority in public affemblies, and even had the precedence of bifhops.

EXOCOETUS, the FLYING-FISH, in ichthiology, conftitutes a diftinct genus of fifhes of the malacopterygious or foft-finned order: it has ten fmall bones in the membrane of the gills; the pectoral fins are extremely long, and fituated juft below the extremity of the covering of the gills on the fides, but elevated towards the back: they almoft equal the whole body of the fifh in length, which greatly refembles an herring, both in fhape and colour. See plate XCIV, fig. 1.

It is caught in the Mediterranean, and other

other seas, and is called by different authors exocœtus, exochinus, hirundo piscis, and mugil alatus.

When pursued by any fish of prey, it throws itself into the air, where it not only suspends itself, but moves very nimbly forwards by means of its long fins, so long as they continue wet.

EXODIARY, *exodiarius*, in the antient roman tragedy, was the person who after the drama or play was ended, sung the exodium. See the article EXODIUM.

EXODIUM, in the antient greek drama, one of the four parts or divisions of tragedy, being so much of the piece as included the catastrophe and unravelling of the plot, and answering nearly to our fourth and fifth acts. See EPILOGUE.

Exodium, among the Romans, consisted of certain humorous verses rehearsed by the exodiarius at the end of the Fabulæ Atellanæ.

EXODIUM, ἐξόδιον, in the septuagint signifies the end or conclusion of a feast. Particularly it is used for the eighth day of the feast of tabernacles, which, it is said, had a special view of the commemoration of the Exodus or departure out of Egypt.

EXODIUM was also the name of a song sung at the conclusion of a feast.

EXODUS, a canonical book of the Old Testament; being the second of the pentateuch, or five books of Moses.

It is also called, from the greek ἔξοδος, going out or departure of the children of Israel from the land of Egypt; the history of which is delivered in this book, together with the many miracles wrought on that occasion.

EX OFFICIO, among lawyers, signifies the power a person has, by virtue of his office, to do certain acts without being applied to. Thus a justice of peace may ex officio, at his discretion, take surety of the peace, without complaint made by any person whatsoever.

There was formerly an oath ex officio, whereby a supposed offender was compelled in the ecclesiastical court to confess, accuse, or clear himself of a crime; but this law is repealed.

EXOMPHALUS, ἐξόμφαλος, in surgery, called also omphalocele, and hernia umbilicalis, is a preternatural tumour of the abdomen at the navel from the rupture, or distension of the parts which invest that cavity. These ruptures differ by their size and figure, some being small, especially when recent, others large and sometimes monstrous. Some are of a round figure, others acuminated, and Heister mentions an exomphalus in a woman with child, which resembled the size and figure of the penis.

Umbilical ruptures are again distinguished according to their contents, as if from the intestines, enteromphalocele; from the omentum epiplomphalocele; and if from air or wind, pneumatomphalocele: Some of these tumours are again distinguished by their consistence into hard or soft, returnable or not, painful or incarcerated.

An exomphalus arises from various causes; but the immediate cause is always some force exerted upon the abdomen, especially near the navel, such as a violent and sudden motion, a fall, a violent blow, or leap, strong coughing or sneezing, straining to lift great weights, difficult labour in women, &c. by which causes the peritonæum at the navel is either dilated, or as it sometimes happens, entirely broke off. The method of cure is twofold, according as the intestines are returnable into the abdomen or not. If the first can be practised, it should be done without any delay, and the parts secured against a future relapse by a girdle or bandage. But if the intestine cannot be returned through the straitness of the aperture in the peritonæum, and the patient is tortured with violent pain in the part affected, with vomiting, and other bad symptoms, to apply the bandage in that case would not only be useless, but pernicious: the patient should rather be treated with emollient clysters and cataplasms, to relax the parts, and facilitate their return; and if he is inclined to be feverish, it may then be proper to bleed, as in other inflammatory distempers, by which means the distended vessels of the intestine will be contracted, and probably afterwards returned by a gentle pressure of the hands, to be then secured with compress, bandage, and a proper instrument. If the disorder becomes still worse, after bleeding and the use of other medicines, the surgeon should then proceed to the operation, which consists chiefly in dilating the wound of the abdomen so as to make it large enough to return the intestine: for this purpose he makes a transverse incision through the integuments, and if the tumour be large, a crucial incision, taking great care not to injure the intestine; then the peritonæum, which immediately

invests

invests the intestine, may be dilated with as small an incision as possible, and the intestine afterwards returned into the abdomen. See the article HERNIA.

EXONERATIONE SECTÆ, in law, a writ which formerly lay, to free the king's ward from all suit to courts. See the article WARD.

EXORCISM, ἐξορκισμὸς, among ecclesiastical writers, the expelling devils from persons possessed, by means of conjurations and prayers. See CONJURATION.

Exorcism makes a considerable part of the superstition of the church of Rome, the rituals of which forbid the exorcising any person without the bishop's leave.

The ceremony is performed at the lower end of the church, towards the door. The exorcist first signs the possessed person with the sign of the cross, makes him kneel, and sprinkles him with holy water. Then follow the litanies, psalms, and prayer; after which the exorcist asks the devil his name, and adjures him by the mysteries of the christian religion, not to afflict the person any more: then, laying his right hand on the dæmoniac's head, he repeats the form of exorcism, which is this: "I exorcise thee, unclean spirit, "in the name of Jesus Christ: tremble, "O satan! thou enemy of the faith, thou "foe of mankind, who hast brought "death into the world, who hast depriv-"ed men of life, and hast rebelled against "justice; thou seducer of mankind, "thou root of evil, thou source of ava-"rice, discord and envy."

The romanists likewise exorcise houses and other places, supposed to be haunted by unclean spirits; and the ceremony is much the same with that for persons possessed.

EXORCISTS, in church-history, an order of men, in the antient church, whose employment it was to exorcise or cast out devils. See the preceding article.

EXORDIUM, in rhetoric, is the preamble or beginning, serving to prepare the audience for the rest of the discourse.

Exordiums are of two kinds, either just and formal, or vehement and abrupt. The last are most suitable on occasions of extraordinary joy, indignation, or the like.

All exordiums should be composed with a view to captivate the good will, or attract the attention of the audience. The first may be done by paying them some compliment: thus St. Paul, *I think my self happy, king Agrippa, because I shall answer for myself this day before thee, touching all the things whereof I am accused of the Jews, especially because I know thee to be expert in all customs and questions which are among the Jews.*

Attention is procured by promising to treat some weighty, useful, pleasant, or surprising subject: and thus Horace, Ode i. lib. 3.

Favete linguis: carmina non prius
Audita, musarum sacerdos,
Virginibus puerisque canto.

The requisites in an exordium are, 1. Propriety, whereby it becomes of a piece with the subject, and matches it as a part does a whole: in this the Greeks were very defective. 2. Modesty which very much recommends the orator to the favour of his audience. And, 3. Brevity, not amplified or swelled with a detail of circumstances.

The style should not be too much raised, nor should it run into bombast: and, above all things, the vain glory should be avoided of that author, who, according to Horace, began his poem thus,

Fortunam Priami cantabo & nobile bellum.

See the article PROPOSITION.

It was forbidden to make exordiums in the areopagus at Athens, as it is an indirect and imperceptible manner of prepossessing the audience.

EXOSTOSIS, in surgery, a preternatural eminence or excrescence of a bone, whether attended with an erosion or not.

When an exostosis is attended with no bad symptoms, it is best to let it alone, as the remedy will be worse than the disease. But if it occasions great deformity, impedes any action, or produces pain or other mischiefs, it may be removed in the manner directed under the article SPINA VENTOSA.

EXOTIC, an appellation denoting a thing to be the produce of foreign countries.

Exotic plants of the hot climates are very numerous, and require the utmost attention of the gardiner to make them thrive with us. See the articles STOVE and GREEN-HOUSE.

EXPANSION, among metaphysicians, denotes the idea we have of lasting distance, all whose parts exist together.

EXPANSION, in physiology, the swelling or increase of the bulk of bodies when heated. See the article HEAT.

Dr. Halley found boiling water to expand one twenty-sixth part of its former bulk: but with a moderate heat, its expansion was imperceptible. Mercury, with a very

very gentle heat, expanded one seventy-fourth of its usual bulk when cold. Spirit of wine, with a heat much less than that of boiling water, expanded itself to a twelfth part of its bulk, when cold, and then fell a boiling and emitting bubbles copiously. Mr. Boyle, in his book Of Cold, tells us, he found the expansion of water by freezing to be about a tenth part of a space more than the water usually takes up. See FREEZING.

Dr. Gregory shews, that if a globule of air, only one inch in diameter, had so great an expansion as it would have at a semi-diameter of the earth from its surface, it would fill all the planetary regions, as far as, and even beyond the sphere of saturn. See the article AIR.

But besides fluids, the most solid bodies are expanded by heat, though not in the inverse ratio of their specific gravities or cohesion, nor even in the ratio compounded of both. The degree of expansion seems rather to depend on the different arrangement, magnitude, and figure of their component parts. According to professor Muschenbroek, the expansions of metals in the same degree of heat, are as follows, *viz.* silver 78, iron 80, copper 89, brass 110, tin 153, lead 155. As to the time of their beginning to expand, it is found to be in the following order, *viz.* tin first, then lead, silver, brass, copper, and, last of all, iron; the reason of which is thought to depend upon the different structures of their pores, and their being more or less fitted to admit the influence of the fire.

For the expansion of the metalline rods of pendulums, and how remedied, see the article PENDULUM.

EX PARTE, a term used in the court of chancery, where a commission is taken out and executed by one side or party only, upon the other party's neglecting or refusing to join therein.

When both the parties proceed together, it is called a joint commission.

EX PARTE TALIS, a writ that lies for a bailiff or receiver, that having auditors assigned to pass his accounts, cannot procure from them reasonable allowance, but is cast into prison; in which case the practice is to sue this writ out of the chancery, directed to the sheriff to take the four mainpernors to bring his body before the barons of the exchequer, at a certain day, and to warn the lord to appear at the same time.

EXPECTANT, in law, signifies having relation to, or depending on: thus, where land is given to a man and his wife, and to their heirs, they have a fee simple estate; but if it be given to them and the heirs of their bodies begotten, they have an estate tail, and a fee expectant, which is opposed to fee simple.

EXPECTATIVE, in the canon-law, an expectation grounded on the promise of having the next benefice that shall become vacant; or a right to the reversion of the next benefice. See BENEFICE.

EXPECTATIVE GRACES, *gratiæ expectativæ*, bulls antiently given by the popes, for obtaining some benefices that should become vacant.

These bulls were very mortifying to bishops, because they encroached on their privileges: besides, they were odious as they induced people to wish the death of others. The council of Trent annulled all expectatives; but the canons relating thereto were never admitted in France, where the right of conferring expectative graces is one of the king's prerogatives.

EXPECTORANTS, in pharmacy, medicines which promote expectoration. See the next article.

These medicines are very numerous: the most considerable in the vegetable kingdom are the roots of elecampane, arum, florentine orris, and liquorice; the herbs paul's betony, chervil, scabious, mouse-ear, germander, hyssop, and tarragon; the flowers of violets, mallows, red poppies, and saffron; the seeds of anise and fennel; the bark of sassafras: and among resinous gums, benjamin and gum ammoniac: among fruits, raisins, figs, jujubes, and pine-kernels: honey, liquorice-juice, and oil of sweet almonds: among animal substances, sperma ceti and fats: among mineral substances, sulphur, together with its flowers and milk: among compound substances, the anisated spirit of sal ammoniac, the lohoch sanum, the syrup prepared of the lungs of a fox, the pectoral elixir, and the asthmatic spirit of Michaeli.

EXPECTORATION, the act of evacuating or bringing up phlegm, or other matters out of the trachea, lungs, *&c.* by coughing, hauking, spitting, *&c.* in order to which there are four things necessary; 1. That the matter contained there, be moveable and penetrable, so that its most fluid parts may not be dissipated, and the matter that remains become viscid, tough, and inextricable. 2. That the passages may be opened and lubricated. 3. That the

the matter be provoked to excretion. 4. That the ftuffed veffels may be at reft, fo as to become capable of relaxation; for if they are continually irritated, the moifture will be always thrown out of the glands of the afpera arteria with a fenfe of pain. See the preceding article.

EXPEDITATE, in the foreft-law, fignifies to cut out the balls of a great dog's feet, belonging to people near the foreft, for the prefervation of the king's game: yet the ball of the foot of a maftiff is not to be cut out, but only the three claws of the fore foot.

Every perfon keeping a dog that is not expeditated, forfeits 3 s. 4 d.

EXPENDITORS, the perfon who difburfe or expend the money collected by the tax for repairs of fewers, after the fame is paid into their hands by the collectors, as ordered by the commiffioners, and for which they are to render accounts when required.

EXPENSIS LITIS, COSTS *of fuit*. See the article COSTS.

EXPENSIS MILITUM LEVANDIS, a writ antiently directed to the fheriff, for levying the allowance for knights of the fhire; and, Expenfis militum non levandis, was a writ to hinder the fheriff from levying fuch allowance upon lands that held in antient demefne.

EXPERIENCE, a kind of knowlege acquired by long ufe, without any teacher. Mr. Locke fays that men receive all the materials of knowlege from experience and obfervation. See the article IDEA.

Experience then confifts in the ideas of things we have feen or read, which the judgment has reflected on, to form itfelf a rule or method.

Chauvinus enumerates three kinds of experience; the firft is the fimple ufe of the external fenfes, whereby we perceive the phænomena of natural things, without any direct attention thereto, or making any application thereof. The fecond is when we premeditately and defignedly make trials of various things, or obferve thofe done by others, attending to all the effects and circumftances. The third is that preceded by a foreknowlege, or, at leaft an apprehenfion of the event, and determines whether the apprehenfion were true or falfe.

EXPERIMENT, in philofophy, is the trial of the refult or effect of the applications and motions of certain natural bodies, in order to difcover fomething of their motions and relations, whereby to afcertain fome of their phænomena, or caufes. See the article EXPERIMENTAL PHILOSOPHY.

Torricellian EXPERIMENT. See the article TORRICELLIAN.

EXPERIMENTAL PHILOSOPHY, that philofophy which proceeds on experiments, which deduces the laws of nature, and the properties and powers of bodies, and their actions upon each other, from fenfible experiments and obfervations. The bufinefs of experimental philofophy is to enquire into and to inveftigate the reafons and caufes of the various appearances or phænomena of nature, and to make the truth or probability thereof obvious and evident to the fenfes, by plain, undeniable, and adequate experiments, reprefenting the feveral parts of the grand machinery and agency of nature.

In our enquiries into nature, we are to be conducted by thofe rules and maxims which are found to be genuine, and confonant to a juft method of phyfical reafoning; and thefe rules of philofophizing are by the greateft mafter in fcience, fir Ifaac Newton, reckoned four, which are as follows:

1. More caufes of natural things are not to be admitted, than are both true, and fufficient to explain the phænomena; for nature does nothing in vain, but is fimple, and delights not in fuperfluous caufes of things.

2. And, therefore, of natural effects of the fame kind, the fame caufes are to be affigned, as far as it can be done: as of refpiration in man and beafts, of the defcent of ftones in Europe and America, of light in a culinary fire and in the fun, and of the reflection of light in the earth and in the planets.

3. The qualities of natural bodies which cannot be increafed or diminifhed, and agree to all bodies in which experiments can be made, are to be reckoned as the qualities of all bodies whatfoever: thus, becaufe extenfion, divifibility, hardnefs, impenetrability, mobility, the vis intertiæ, and gravity are found in all bodies which fall under our cognizance or infpection, we may juftly conclude they belong to all bodies whatfoever, and are therefore to be efteemed the original and univerfal properties of all natural bodies.

4. In experimental philofophy, propofitions collected from the phænomena by induction, are to be deemed (notwithftanding

ſtanding contrary hypotheſes) either exactly or very nearly true, till other phænomena occur, by which they may be rendered either more accurate, or liable to exception. This ought to be done, leſt arguments of induction ſhould be deſtroyed by hypotheſes.

Theſe four rules of philoſophizing are premiſed by ſir Iſaac Newton to his third book of the Principia; and more particularly explained by him in his Optics, where he exhibits the method of proceeding in philoſophy, the firſt part of which is as follows.

As in mathematics, ſo in natural hiſtory, the inveſtigation of difficult things, by way of analyſis, ought always to precede the method of compoſition. This analyſis conſiſts in making experiments and obſervations, and in drawing general concluſions from them by induction (*i. e.* reaſoning from the analogy of things by natural conſequence) and admitting no objections againſt the concluſions, but what are taken from experiments or certain truths. And although the arguing from experiments and obſervation, by induction, be no demonſtration of general concluſions, yet it is the beſt way of arguing which the nature of things admits of, and may be looked on as ſo much the ſtronger, by how much the induction is more general; and if no exception occur from phænomena, the concluſion may be pronounced generally; but if at any time afterwards, any exception ſhall occur from experiments, it may then be pronounced with ſuch exceptions: by this way of analyſis we may proceed from compounds to ingredients, and from motions to the cauſes producing them; and, in general, from effects to their cauſes; and from particular cauſes to more general ones, till the argument ends in the moſt general: this is the method of analyſis. And that of ſyntheſis, or compoſition, conſiſts in aſſuming cauſes, diſcovered and eſtabliſhed as principles, and by them explaining the phænomena, proceeding from them, and proving the explanations. See ANALYSIS, SYNTHESIS, SUBSTANCE, ELEMENT, WATER, VAPOUR, *&c.*

EXPERIMENTUM CRUCIS, a capital, leading, or deciſive experiment; thus termed, either on account of its being like a croſs, or direction poſt, placed in the meeting of ſeveral roads, guiding men to the true knowlege of the nature of that thing they are enquiring after; or, on account of its being a kind of torture, whereby the nature of the thing is as it were extorted by force.

EXPIATION, a religious act, by which ſatisfaction, attonement, or amends is made for the commiſſion of ſome crime, the guilt done away, and the obligation to puniſhment cancelled.

The method of expiation, among the Jews, was chiefly by ſacrifice, whether for ſins of ignorance, or to purify themſelves from certain pollutions; as a woman after child-birth, a leper after cleanſing, *&c.* See the articles SACRIFICE and PURIFICATION.

Great day of EXPIATION, an annual ſolemnity of the Jews, upon the tenth day of the month Tiſri, which anſwers to our September. On this occaſion the high prieſt laid aſide his breaſt-plate and embroidered ephod, as being a day of humiliation. He firſt offered a bullock and a ram for his own ſins, and thoſe of the prieſts; then he received from the heads of the people two goats for a ſin-offering, and a ram for a burnt offering, to be offered in the name of the whole multitude. It was determined by lot which of the goats ſhould be ſacrificed, and which ſet at liberty. After this he perfumed the ſanctuary with incenſe, and ſprinkled it with blood: then, coming out, he ſacrificed the goat, upon which the lot had fallen. This done, the goat, which was to be ſet at liberty, being brought to him, he laid his hands upon its head, confeſſed his ſins, and the ſins of the people, and then ſent him away into ſome deſart place: it was called azazel, or the ſcape goat. See the article SCAPE-GOAT.

As to the expiations among the heathens, they were of ſeveral kinds, as ſacrifices and religious waſhings.

EXPIATION, in a figurative ſenſe, is applied by divines to the pardon procured to mens ſins, by the merits of Chriſt's death.

EXPILATION, among civilians, the carrying off, or ſequeſtring, ſomething belonging to an inheritance, before the heir had intermeddled therewith.

EXPILATION alſo denoted a robbery committed by night, and ſo called from the robbers ſtripping people of their cloaths.

EXPIRATION, in phyſic, that part of reſpiration whereby the air is expelled, or driven out of the lungs. See the article RESPIRATION.

EXPIRATION, in chemiſtry, is applied to all ſorts of evaporation, and ſubtile effluvia, that go off into the air.

EXPIRATION is alſo uſed for the end of any term agreed upon. It likewiſe ſignifies death.

EXPLICITE, in the ſchools, ſomething clear, diſtinct, formal, and unfolded.

EXPLOSION, in phyſics, is properly applied to the going off of gun-powder and the report made thereby. Hence it is uſed to expreſs ſuch ſudden actions of bodies, as generate air inſtantaneouſly, thus, half a dram of carraway-ſeed, poured upon a dram of the compound ſpirit of nitre, in an empty receiver, produced ſuch a prodigious quantity of air as to blow up with an exploſion a receiver of ſix inches in diameter and eight inches deep; the preſſure, therefore, of the atmoſphere on the exhauſted receiver, which it overcomes, is above 400 lb reckoning 15 lb to a ſquare inch. From the experiments in Mr. Robins's New principles of Gunnery, it appears, that the force of fired gun-powder, at the inſtant of its exploſion, is the ſame as that of an elaſtic fluid of a thouſand times the denſity of common air. See GUN-POWDER.

EXPONAS VENDITIONI. See the article VENDITIONI EXPONAS.

EXPONENT, in algebra, is a number placed over any power or involved quantity, to ſhew to what height the root is raiſed: thus, 2 is the exponent of x^2, and 4 the exponent of x^4, or $xxxx$.

We have obſerved, under the article DIVISION, in algebra, that the rule for dividing powers of the ſame quantity, is to ſubtract the exponents, and make the difference the exponent of the quotient: if, therefore, a leſſer power is divided by a greater, the exponent of the quotient; muſt, by this rule, be negative: thus, $\frac{a^4}{a^6}=a^{4-6}=a^{-2}$. But $\frac{a^4}{a^6}=\frac{1}{a^2}$; and hence $\frac{1}{a^2}$ is expreſſed by a^{-2}, with a negative exponent. It is alſo obvious that $\frac{a}{a}=a^{1-1}=a^0$; but $\frac{a}{a}=1$, and therefore $a^0=1$. After the ſame manner, $\frac{1}{a}=\frac{a^0}{a}=a^{0-1}=a^{-1}$; $\frac{1}{aa}=\frac{a^0}{a^2}=a^{0-2}=a^{-2}$; $\frac{1}{aaa}=a^{0-3}=a^{-3}$; ſo that the quantities, a, 1, $\frac{1}{a}$, $\frac{1}{a^2}$, $\frac{1}{a^3}$, $\frac{1}{a^4}$, &c. may be expreſſed thus, a^1, a^0, a^{-1}, a^{-2}, a^{-3}, a^{-4}, &c. Theſe are called the negative powers of a, which have negative exponents; but they are at the ſame time poſitive powers of $\frac{1}{a}$, or a^{-1}. See the articles POWERS and INVOLUTION.

EXPONENT *of a ratio*, is the quotient ariſing from the diviſion of the antecedent by the conſequent: thus, in the ratio of 5 to 4, the exponent is $1\frac{1}{4}$; but the exponent of 4 : 5, is $\frac{4}{5}$.

If the conſequent be unity, the antecedent itſelf is the exponent of the ratio: thus the exponent of the ratio 4 : 1 is 4. Wherefore the exponent of a ratio is to unity as the antecedent is to the conſequent. Altho' the quotient of the diviſion of the antecedent by the conſequent is uſually taken for the exponent of a ratio, yet in reality the exponent of a ratio ought to be a logarithm. And this ſeems to be more agreeable to Euclid's definition of duplicate and triplicate ratios, in his fifth book. For 1, 3, 9, are continual proportionals; now if $\frac{1}{3}$ be the exponent of the ratio of 1 to 3, and $\frac{3}{9}$ or $\frac{1}{3}$ the exponent of the ratio of 3 to 9; and $\frac{1}{9}$ the exponent of the ratio of 1 to 9; and ſince, according to Euclid, if three quantities be proportional, the ratio of the firſt to the third is ſaid to be the duplicate of the ratio of the firſt to the ſecond, and of the ſecond to the third; therefore according to this, $\frac{1}{9}$ muſt be the double of $\frac{1}{3}$, which is very falſe. But it is well known, the logarithm of the ratio of 1 to 9, that is, the logarithm of 9, is the double of the ratio of 1 to 3, or 3 to 9, that is, the logarithm of 3. From whence it appears that logarithms are more properly the exponents of ratios, than numerical quotients; and Dr. Halley, Mr. Cotes, and others, are of the ſame opinion.

EXPONENT, is alſo uſed in arithmetic, in the ſame ſenſe as index or logarithm. See INDEX and LOGARITHM.

EXPONENTIAL CALCULUS. See the article CALCULUS EXPONENTIALIS.

EXPONENTIAL CURVE is that whoſe nature is expreſſed by an exponential equation. The area of any exponential curve whoſe nature is expreſſed by this exponential equation $x^x=y$ (making $1+v=x$) will be $\frac{1}{0.1.2}v^2+\frac{1}{0.1.2.3}v^3-$

$\frac{1}{0.1.2.3.4.}v^4 + \frac{1}{0.1.2.3.4.5.}v^5 - \frac{1}{0.1.2.3.4.5.6.}$, v^6, *&c.* See the article Calculus exponentialis.

Exponential equation is that wherein there is an exponential quantity. See the next article.

Exponential quantity is a quantity whose power is a variable quantity, as x^x, a^x. Exponential quantities are of feveral degrees and orders, according as the exponents themfelves are more or lefs involved. If the exponent be a fimple quantity, as z^y, it is called an exponential of the firft or loweft degree; but when the exponent itfelf is an exponential of the firft degree, as z^{y^x} it is called an exponential of the fecond degree. In like manner, if the exponent itfelf be an exponential of the fecond degree, as $x^{y^{x^o}}$, it is called an exponential of the third degree, *&c.*

EXPORTATION, the fhipping and carrying out of the kingdom wares and commodities, for other countries.

Exportation is part of foreign commerce, diftinguifhed by the appellation active or felling part, in oppofition to importation, which is called the paffive, or buying part. Belloni obferves, that commerce, when active, muft produce a vaft flow of riches, the balance being always received in money; whereas, if it be paffive, the moft immenfe treafures will be foon exhaufted, as the balance of trade muft be continually made good out of the remaining coin. Hence plenty of money in any place, implies that the quantity of goods exported far exceeds that of goods imported; and wherever we fee money fcarce, we may conclude that greater quantities of goods have been imported then exported. See Commerce, Money, and Exchange.

EXPOSITION, in general, denotes the fetting a thing open to public view: thus it is the romanifts fay, the hoft is expofed, when fhewn to the people.

Exposition *of children*, among the antients, a barbarous cuftom of laying down children by the fides of the highway, and other places moft frequented, where they were left at the mercy of the public, and muft unavoidably perifh, unlefs taken up and educated by charitable and compaffionate perfons.

Many expofed their children merely becaufe they were not in a condition to educate them; and as for thofe who expofed them for other reafons, they commonly did it with jewels, with a view no doubt to encourage thofe who found them to take care of their education if alive, or give them human burial, if dead.

Exposition, in a literary fenfe, the explaining an author, paffage, writing, or the like, and fetting their meaning in an obvious and clear light.

Expofition of deeds, of all kinds, ought to be according to the true intent thereof, and reafonable and equal. See Deed.

EXPOSITOR, or Expository, a title given to fmall dictionaries, ferving to explain the hard words of a language.

EX POST facto, in law, fomething done after another: thus an eftate granted may be good by matter ex poft facto, that was not fo at firft, as in cafe of election.

EXPOSTULATION, in rhetoric, a warm addrefs to a perfon, who has done another fome injury, reprefenting the wrong in the ftrongeft terms, and demanding redrefs.

EXPOSURE, in gardening, the fituation of a garden, wall, or the like, with refpect to the points of the compafs, as fouth or eaft. According to Mr. Miller, the beft afpect or expofure for walls, in England, is to have one point to the eaft-ward of the fouth; by reafon thefe will enjoy the benefit of the morning fun, and be lefs expofed to injuries from the weft and fouthweft winds, than walls directly facing the fouth. The next beft afpect is due fouth, and the next to that fouth-eaft, which is preferable to the fouth-weft, for the reafons before affigned. However, as there will, for the moft part, be fouth-weft and weft walls in every garden, thefe may be planted with fuch forts of fruit as do not require fo much heat to ripen them; and wherever there are north walls, they are only fit for baking pears and plums, morello-cherries for preferving, or fome duke cherries may be thus continued longer in the feafon. See the articles Garden, Planting, *&c.*

EXPRESS, fomething that is determinate and precife, or in fuch formal terms as leaves no room for doubt.

Express alfo denotes a courier. See the article Courier.

EXPRESSED oils, in chemiftry, fuch oils as are obtained from bodies only by preffing. See the article Oil.

EXPRES-

EXPRESSION, in chemiſtry, or pharmacy, denotes the act of expreſſing out the juices or oils of vegetables, which is one of the three ways of obtaining them; the other two being by infuſion and decoction.

Oils obtained by means of fire, are called ſtillatitious.

EXPRESSION, in rhetoric, the elocution, diction, or choice of words in a diſcourſe. Beautiful expreſſion is the natural and true light of our thoughts: it is to this we owe all the excellencies in diſcourſe; which gives a kind of vocal life and ſpirit. As the principal end of diſcourſe is to be underſtood, the firſt thing we ſhould endeavour to obtain is a richneſs of expreſſion, or habit of ſpeaking ſo well as to make our thoughts eaſily underſtood. See STYLE, TROPE, RHETORIC, &c.

EXPRESSION, in painting, a natural and lively repreſentation of the ſubject, or of the ſeveral objects intended to be ſhewn. The expreſſion conſiſts chiefly in repreſenting the human body and all its parts, in the action ſuitable to it: in exhibiting in the face the ſeveral paſſions proper to the figures, and obſerving the motions they impreſs on the external parts. See the article ATTITUDE.

The term expreſſion is frequently confounded with that of paſſion, but they differ in this, that expreſſion is a general term, implying a repreſentation of an object agreeably to its nature and character, and the uſe or office it is to have in the work; whereas paſſion, in painting, denotes a motion of the body, accompanied with certain diſpoſitions or airs of the face, which work an agitation in the ſoul: ſo that every paſſion is an expreſſion, but not every expreſſion a paſſion.

The laws of EXPRESSION. Expreſſion being a repreſentation of things according to their character, may be conſidered either with reſpect to the ſubject in general, or to the paſſions peculiar thereto.

Firſt, with reſpect to the ſubject, it is to be obſerved, 1. That all the parts of the compoſition are to be transformed or reduced to the character of the ſubject, ſo as they may conſpire to impreſs the ſame ſentiment, paſſion, or idea. 2. In order to this, if any circumſtance occur in hiſtory or deſcription, that would avert or take from the idea, it muſt be ſuppreſſed, unleſs eſſential to the ſubject. 3. To this end the hiſtory or fable is to be well ſtudied in the authors who deſcribe it, in order to conceive its nature and character truly, and impreſs it ſtrongly on the imagination, that it may be diffuſed and carried through all the parts of the ſubject. 4. A liberty may be taken, to chooſe favourable incidents, in order to diverſify the expreſſion, provided they are not contrary to the principal image of the ſubject, or the truth of hiſtory. 5. The harmony of the *tout enſemble* ought to be particularly regarded, both with reſpect to the actions and the light and colour. See CLARO-OBSCURO. 6. The modes and cuſtoms are to be obſerved, and every thing made conformable to time, place, and quality. 7. The three unities of time, place, and action ought to be obſerved; that is, nothing ſhould be repreſented in the ſame picture, but what is tranſacted or paſſes at the ſame time, and may be ſeen at the ſame view.

Secondly, with reſpect to the particular paſſions and affections of the ſubject, the rules are, 1. That the paſſions of brutes be few and ſimple, and have almoſt all an immediate reſpect either to ſelf-preſervation or the propagation of the ſpecies: but in the human kind there is a greater variety, and accordingly more marks and expreſſions thereof. 2. Children not having the uſe of reaſon, act much after the ſame manner as brutes, and expreſs the motions of their paſſions directly, and without fear or diſguiſe. 3. Though the paſſions of the ſoul may be expreſſed by the actions of the body, it is in the face they are generally ſhewn, and particularly in the turn of the eye, and motions of the eye-brows. 4. There are two ways of lifting up the eye-brows, the one at the middle, which likewiſe draws up the corners of the mouth, and argues pleaſant motions; the other at the point next the noſe, which draws up the middle of the mouth, and is the effect of grief or ſadneſs. 5. The paſſions are all reducible to joy and ſadneſs, each of which is either ſimple, or mixed and paſſionate. 6. Joy cauſes a dilatation of the parts: the eye-brows riſe in the middle; the eyes half open, and ſmiling; the pupil ſparkling, and moiſt; the noſtrils a little open; the cheeks full; the corners of the mouth drawn a little upwards; the lips red; the complexion lively; the forehead ſerene. 7. Paſſionate joy, proceeding from love, ſhews the forehead ſmooth and even, the eye-brows a little elevated on the ſide the pupil is turned to, the eyes ſparkling and open, the head inclined towards the object, the air of

the face ſmiling, and the complexion ruddy. That proceeding from deſire ſhews itſelf by the body, the arms extending towards the object in uncertain and unquiet motions. 8. Simple ſadneſs is expreſſed by the body being caſt down, the head careleſly hanging aſide, the forehead wrinkled, the eye-brows raiſed to the middle of the forehead, the eyes half-ſhut, and the mouth a little open, the corners downwards, the under lip pointing and drawn back, the noſtrils ſwelled and drawn downwards. That mixed with fear cauſes the parts to contract and palpitate, the members to tremble and fold up, the viſage to be pale and livid, the point of the noſtrils elevated, the pupil in the middle of the eye, the mouth opened at the ſides, and the under lip drawn back. In that mixed with anger, the motions are more violent, the parts all agitated, the muſcles ſwelled, the pupil wild and ſparkling, the point of the eye-brows fixed to the noſe, the noſtrils open, the lips big and preſſed down, the corners of the mouth a little open and foaming, the veins ſwelled, and the hair erect. That with deſpair reſembles the laſt, only more exceſſive and diſordered. 9. The hand has a great ſhare in the expreſſion of the ſentiments and paſſions; the raiſing of the hands, conjoined, towards heaven, expreſſes devotion; wringing the hands, grief; throwing them towards heaven, admiration; fainting and dejected hands, amazement and deſpair; folding hands, idleneſs; holding the fingers indented, muſing; holding forth the hands together, yielding and ſubmiſſion; lifting up the hand and eye to heaven, calling God to witneſs; waving the hand from us, prohibition; extending the right hand to any one, pity, peace, and ſafety; ſcratching the head, thoughtfulneſs; laying the hand on the heart, ſolemn affirmation; holding up the thumb, approbation; laying the fourth finger on the mouth, bidding ſilence; giving with the finger and thumb, a giving ſparingly; and the fore-finger put forth and the reſt contracted to ſhew and point at, as much as to ſay, *this is he*. 10. The ſex of the figure is to be regarded; and man, as he is of a more vigorous and reſolute nature, ought to be expreſſed in all his actions freer and bolder than women, who are to be more reſerved and tender. 11. So alſo as to the age, the different ſtages whereof incline to different motions both of body and mind, 12. The condition or honours a perſon is inveſted with, renders their actions more reſerved, and their motions more grave, contrary to the populace, who obſerve little conduct or reſtraint, giving themſelves up, for the moſt part, to their paſſions; whence their external motions become rude and diſorderly.

Laſtly, in ſpirits, all thoſe corruptible things muſt be retrenched, which ſerved only for the preſervation of life, as veins, arteries, &c. only retaining what may ſerve for the form and beauty of the body. In angels particularly, as ſymbolical figures, their offices and virtues are to be marked out, without any draught of ſenſual paſſions, only appropriating their characters to their functions of powers, activity and contemplation.

EXPULSION, in a general ſenſe, the act of violently driving a perſon out of any city, ſociety, &c.

EXPULSION, in medicine, the act whereby any thing is forcibly driven out of the place in which it is: thus we ſay, the expulſion of the fœtus in delivery. See the article DELIVERY.

EXPURGATION, in aſtronomy, a term uſed by ſome authors for emerſion. See the article EMERSION.

EXQUIMA, in zoology, a ſpecies of guinea monkey, of a reddiſh brown, ſpotted with white on the upper part of the body, and the under part white, with a beard of a beautiful ſnow-white colour. See the article MONKEY.

EXSICCATION, in chemiſtry, is the act of reducing bodies to a required ſtate of drineſs, by ſeparating the ſuperfluous water or other moiſture with which they were joined.

Exſiccation is moſt generally performed by means of heat; but as the different nature and form of the matter make different degrees and methods of application of the heat neceſſary, three of them have been diſtinguiſhed by the names of coction, inſolation, and torrification. The firſt relates only to fluids; the ſecond to fluids and ſolids promiſcuouſly; the laſt to ſolids only. As to coction or boiling, you are to take care, that, at the cloſe of the operation, the fire be duly ſuppreſſed; otherwiſe the matter being left dry, will be heated beyond the juſt degree, and thence either conſumed or damaged. This precaution is particularly neceſſary in the caſe of vegetable extracts, where the leaſt overheat is apt to make them burn, and acquire an empyreumatic

reumatic ſcent and flavour. Solutions of ſalts and gums make the principal caſes where coction is uſed in this intention.

Inſolation, or perhaps more properly exhalation, is effected by expoſing the body to the heat of the ſun, till it be ſufficiently dry. In this the ſurface of the matter is to be increaſed as much as poſſible; for in proportion to that will the exſiccation be completed in a greater or leſſer time.

Torrification, or, in the caſe of rhubarb, toaſting, is the expoſing ſolid bodies to the heat of a fire, at ſuch a due diſtance as will not endanger their being burnt, in order to dry them ſo as to be powdered. When roots or woods are thus to be treated, it is proper firſt to cut them into ſlices.

Decantation and filtering are uſed ſubſervient to exſiccation, where large quantities of fluid are to be ſeparated, and after all the exſiccation may be completed by inſolation. This is practiſed in the caſe of precipitations, and where any earths or calx's of metals are to be freed from fluids.

Filtering by attraction is performed by a twiſt of cotton thread made wet, one of which is put into the veſſel containing the matter to be filtered, and the other ſuffered to be hang over the veſſel below the bottom. The thread will act as a ſyphon and draw off the fluid, which will drop from its end till the greateſt part be exhauſted. This method is uſed in the preparation of elaterium; and where the quantity is ſmall, may be found convenient in many others.

The uſe of the chalk-ſtone is another method of exſiccation, chiefly applied to the drying of powders after their levigation. It is done by laying the powder in troches or large drops, on the ſtone, and letting them remain there till they are ſufficiently dry.

EXTANT, denotes any thing that exiſts, or is ſtill in being.

EXTASY, or ECTASY, a tranſport which ſuſpends the function of the ſenſes, by the intenſe contemplation of ſome extraordinary or ſupernatural object, or when God impreſſes on the imagination the extraordinary ideas of any thing he would reveal.

EXTASY, in medicine, a ſpecies of catalepſy, when a perſon perfectly remembers, after the paroxyſm is over, the ideas he conceived during the time it laſted. In an extaſy there muſt be an unuſual tenſion of the ſenſory, as is common in deliriums, &c.

EXTEND, in law, ſignifies to value the lands or tenements of a perſon bound by a ſtatute, &c. who has forfeited the ſame, at ſuch an indifferent rate, that by the yearly rent the creditor in time may be paid his debt. See EXTENT.

EXTENDI FACIAS, a writ to extend lands, &c. See the preceding article.

EXTENSION, in philoſophy, one of the common and eſſential properties of body or that by which it poſſeſſes or takes up ſome part of univerſal ſpace, which is called the place of that body. See the articles BODY and SPACE.

Extenſion is threefold, 1. Either into length only, and then it is called a line. Or, 2. Into length and breadth, which is called a ſuperficies. Or, 3. Into length, breadth, and depth, which is called a ſolid; being the three dimenſions according to the quantity of which the magnitude or bulk of bodies are eſtimated. See LINE, SUPERFICIES, and SOLID.

Extenſion, according to Mr. Locke, is ſpace conſidered between the extremities of matter, which fills up its capacity with ſomething ſolid, tangible, and moveable. Space, ſays that philoſopher, may be conceived without the idea of extenſion, which belongs to body only.

EXTENSION *of fractured limbs*, in ſurgery, ought to be performed in the following manner: 1. The patient is to be kept firm and ſteady. The poſture of body to be obſerved at this time differs, according to the circumſtances of the caſe; ſometimes the patient ſhould ſit, either upon a ſtool, or upon the floor. 2. An aſſiſtant ſhould ſupport the limb with his hands, both above and below the fractured part. 3. The aſſiſtant, who holds the lower part of the limb, ſhould extend it ſtrongly and equally, till the fractured bone can be replaced: if his hands alone are not ſufficient to make the required extenſion, he muſt uſe a chord, or rather a napkin: if one man has not ſtrength enough for this office, there muſt be two or more employed.

You muſt be careful not to uſe too great roughneſs in this operation, leſt you give your patient unneceſſary pain. If the tumour and inflammation is come on before the extenſion, it is beſt to defer it till theſe ſymptoms are removed. When the fractured bones maintain their natural ſituation, you are under no neceſſity of extending or replacing the limb; but when

when the fractured parts recede from each other, some degree of extension is necessary, which must be always suited to the distortion of the limb: the greater distance there is between the extremities of the divided parts of the bone, so much shorter will the limb be, from the contraction of the muscles; therefore the extension in this place ought to be so much the greater. See the article FRACTURE.

The extension in luxated bones is to be performed much in the same manner with that in fractures, *viz.* the outer or lower part of the dislocated limb is to be extended till the head of the disordered bone be reduced exactly into the sinus from whence it was luxated.

EXTENSOR, an appellation given to several muscles, from their extending or stretching the parts to which they belong: such are, 1. The common extensor of the fingers, which has its origin at the external condyle of the humerus, and the posterior part of the radius and ulna: it afterwards divides into four tendons, which pass under the ligament of the carpus, and terminate in the posterior surface of all the phalanges of the fingers, where they are gibbous. 2. The extensor of the thumb, called also bicornis and tricornis, arises in the posterior and middle part of the radius and ulna, and terminates in two or three tendons in the first, second, and third phalanx of the thumb. 3. The proper extensors of each finger, which are a part of, or at least have their origin with the common extensor. 4. The long extensor of the toes, which has its origin in the upper part of the tibia, and in the anterior part of the ligament, between the tibia and fibula: it afterwards divides into five tendons, four of which are inserted into the four phalanges of the toes, and the fifth into the outer metatarsal bone. 5. The short extensor of the toes, arises from the upper part of the calcaneum, and dividing into tendons, is inserted into the toes.

Besides these, there are proper extensors of the toes; also the long and short extensors of the great toe, and the common extensor of the back and loins, which is divided into three. If these act only on one side, they draw the parts obliquely sideways.

EXTENT, in law, is used in a double sense; sometimes it signifies a writ or command to the sheriff for the valuing of lands or tenements; and sometimes the act of the sheriff, or other commissioner, upon this writ: but most commonly it denotes an estimate or valuation of lands; and hence come our extended or rack-rents. See the article EXTEND.

Every extent ought to be made on inquisition and verdict, without which the sheriff cannot legally execute the writ. The cognizee, or party to whom the lands are delivered, has no absolute property in them, but is accountable to the cognisor according to the extended value only, not the real value. No seisin can be on an extent, nor may lands or goods be sold thereon.

EXTERIOR, or EXTERNAL. See the article EXTERNAL.

EXTERMINATION, in general, the extirpating or destroying something.

In algebra, surds, fractions, and unknown quantities are exterminated by the rules for reducing equations. See the article EQUATION.

We have two curious theorems in Mr. Maclaurin's algebra, for exterminating unknown quantities of given equations; and here it is proper to observe, that he calls all the coefficients, prefixed to the same unknown quantity, coefficients of the same order: such are a, d, g, in theorem 2. as being prefixed to the same quantity x: such also are b, e, h; and c, f, k. But he calls those opposite coefficients, that are taken each from a different equation, and from a different order of coefficients, as a and e, and d and b, in the first theorem; and a, e, k; a, b, f; and d, b, k, in the second theorem.

Theorem 1. Suppose two equations given involving two unknown quantities, as $\left\{\begin{matrix} ax+by=c \\ dx+ey=f \end{matrix}\right\}$ then shall $y=\frac{af-dc}{ae-db}$.

Where the numerator is the difference of the products of the opposite coefficients, in the orders in which y is not found; and the denominator is the difference of the products of the opposite coefficients, taken from the orders that involve the unknown quantities. For from the first equation it appears that $ax=c-by$, and $x=\frac{c-by}{a}$; and from the second equation, that $dx=f-ey$, and $x=\frac{f-ey}{d}$. Therefore, $\frac{c-by}{a}=\frac{f-ey}{d}$; and $cd-dby=af-aey$, whence $aey-dby=af-cd$; and $y=\frac{af-cd}{ae-db}$. Q. E. D.

To

To exemplify this theorem, ſuppoſe $a=5$, $b=7$, $c=100$, $d=3$, $e=8$, and $f=80$. Then $y=\frac{5\times80-3\times100}{5\times8-3\times7}=\frac{100}{19}=5\frac{5}{19}$; and $x=\frac{240}{19}=12\frac{12}{19}$.

Theorem 2. Suppoſe now that there are three unknown quantities, x, y, z, and three equations: thus,

$$\left\{\begin{array}{l} ax+by+cz=m \\ dx+ey+fz=n \\ gx+by+kz=p \end{array}\right\}$$ Then ſhall $z=$

$$\frac{aep-abn+dbm-dbp+gbn-gem}{aek-afh+dhc-dbk+gbf-gec}.$$

Where the numerator conſiſts of all the different products that can be made of three oppoſite coefficients, taken from the orders in which z is not found; and the denominator conſiſts of all the products that can be made of the three oppoſite coefficients, taken from the orders that involve the three unknown quantities. For from the laſt it appears, that $y=\frac{an-afz-dm+dcz}{ae-db}$, and $y=\frac{ap-akz-gm+gcz}{ab-gb}$; therefore, $\frac{an-afz-dm+dcz}{ae-db}=\frac{ap-akz-gm+gcz}{ab-gb}$ and $\overline{an-afz-dm+dcz}\times\overline{ab-gb}\times\overline{an-afz}+gbdm-gbdcz=\overline{ap-gm-akz+gcz}\times\overline{ae-db}\times\overline{ap-akz}+gbdm-gbdcz$. Take $gbdm-gbdcz$ from both ſides, and divide by a; ſo ſhall $\overline{an-dm-afz+dcz}\times b-gbn+gbfz=\overline{ap-gm-akz+gcz}\times e-dbp+dbkz$. Then tranſpoſing and dividing will be found

$$z=\frac{aep-abn+dbm-dbp+gbn-gem}{aek-abf+dbc-dbk+gbf-gec}.$$

The values of x and y are found after the ſame manner, and have the ſame denominator: *ex. gr.*

$$y=\frac{afp-akn+dkm-dep+gen-gfm}{aek-abf+dbc-dbk+gbf-gec}.$$

If any term is wanting in any of the three given equations, the values of z and y will be found more ſimple. Thus, ſuppoſe that f and k are equal to nothing, then the term fz will vaniſh in the ſecond equation, and kz in the third; and $z=\frac{aep-abn+dbm-dbp+gbn-gem}{dbc-gec}$, and $y=\frac{gcn-dep}{dbc-gec}$.

If four equations are given, involving four unknown quantities, their values may be found much in the ſame manner, by taking all the products that can be made of four oppoſite coefficients, and always prefixing contrary ſigns to thoſe that involve the products of two oppoſite coefficients. See the articles COEFFICIENT and EQUATION.

EXTERNAL, or EXTERIOR, a term of relation applied to the ſurface or outſide of a body; or that part which appears or preſents itſelf to the eye, touch, &c. in contradiſtinction to internal. See the article INTERNAL.

EXTERNAL MEDICINES, the ſame with local or topical medicines. See the articles TOPICS and LOCAL MEDICINES.

The ſenſes are alſo divided into external, being thoſe whereby we perceive ideas, or have the perception of external objects, as ſeeing, hearing, &c. and internal. See the article SENSE.

EXTERNAL is alſo uſed to ſignify any thing that is without-ſide a man, or that is not within himſelf, particularly in his mind, in which ſenſe we may ſay external objects, &c.

The exiſtence of an external world, that is, of bodies and objects out of the mind, was abſolutely denied by Dr. Berkeley. See the article EXISTENCE.

EXTERNAL ANGLES, are the angles on the outſide of any right-lined figure, when all the ſides are ſeverally produced, and they are all, taken together, equal to four right angles. See the article ANGLE.

EXTERNAL EAR. See the article EAR.

EXTINCTION, in general, denotes the putting out or deſtroying ſomething, as a fire or flame.

Various engines have been contrived for extinguiſhing accidental fires, for which ſee ENGINE and FIRE.

EXTINCTION, in chemiſtry, is when a metal, mineral, &c. after having been heated red hot, is plunged into ſome fluid; either to ſoften and temper its acrimony, as tutty in roſe-water; or to communicate its virtue to the liquor, as iron or ſteel to common water, &c.

EXTINGUISHMENT, in law, is a conſolidation or union, as where one has due to him a yearly rent out of lands, and afterwards purchaſes the lands out of which the rent ariſes: in this caſe, both the property and the rent being united in one poſſeſſor, the rent is ſaid to be extinguiſhed. Likewiſe where a perſon has a leaſe for years, and he afterwards buys the property of what is leaſed, the leaſe becomes thereby extinguiſhed.

There is, however, a difference on purchaſing

chasing part of the lands, and the several sorts of rents: thus if a person has a rent-charge granted to him and his heirs, issuing out of land, and he purchases any part of that land to him and his heirs; as this rent is entire, and issuing out of every part of the land, the whole rent-charge is extinguished. Yet if such person has a rent-service, and he does purchase part of the lands where-out it issues, this shall not extinguish all the rent, but only for the land purchased.

EXTINGUISHMENT *of common*, is by purchasing all the lands which have interest therein: also if a commoner releases his common in one acre, it is an extinguishment of the whole; but where he aliens part of his lands, to which the common belongs, the common is not distinguished thereby, but shall be divided.

EXTINGUISHMENT *services*. If the lord purchases or accepts any part of the tenancy, out of which an entire service is to be paid, the service becomes thereby extinct; unless it be for the public good, or homage and fealty, which are not subject to entinguishment.

EXTINGUISHMENT *of ways*, is where a person has a highway as appendant, and he makes a purchase of the land in which the way is, then the way is extinct: tho' it is held, that a way of necessity, to a market or church, is not so.

EXTIRPATION, the same with extermination. See EXTERMINATION.

EXTIRPATIONE, in law, a judicial writ that lies against a person, who, after a verdict found against him for land, &c. maliciously overthrows a house, or extirpates any trees upon it.

EXTISPEX, in antiquity, the person who drew presages from viewing the entrails of animals offered in sacrifice. See SACRIFICE, HARUSPEX, and DIVINATION.

EXTORTION, in law, is an illegal manner of wresting any thing from a man either by force, menace, or authority. It is also the exaction of unlawful usury, winning by unlawful games, and taking more than is due under pretence of right, as excessive tolls in millers, &c.

At the common law, extortion is punishable by fine and imprisonment; and the statute of 3 Eliz. 1. c. 30. has enacted, that officers of justice guilty of extortion for the expedition of business, &c. shall render to the party treble value. There are likewise divers other statutes for punishing extortions of sheriffs, bailiffs, gaolers, clerks of the assise and of the peace, attornies, solicitors, &c.

EXTRA, a latin preposition signifying *without*, and used in composition with other words, as for instance, 1. Extra-judicial, where judgment is given in a cause that is not depending in the court where the same passed; or whereon the judgment has no jurisdiction. 2. Extra-parochial, which is said of places out of the bounds of any parish, or freed from the duties of a parish. The greatest part of the forests in England are extra-parochial.

EXTRACT, in pharmacy, is a solution of the purer parts of a mixed body inspissated, by distillation or evaporation, nearly to the consistence of honey. Extracts may be made almost of every part of the materia medica, or from any medicine, whether simple or compound, that is suited to give a tincture to any menstruum, in which it is customarily infused. They make a principal part of modern pharmacy, and with great reason too; for the different elements of many compound bodies have quantities and powers, when separate and pure, which they are incapable of exerting when their force is supprest by the quantity, or counteracted by the repugnant qualities of other species wherewith they are conjoined, as in the instances of acid spirits, testaceous earths, calces of metals, gums or resins of vegetables, and many others. The directions given by the college of physicians for making extracts, are these. Take the matter from which the extract is to be prepared, cut, bruise, or otherwise manage it, as its nature requires, for infusion. Pour upon it spirit of wine, or any distilled waters, most accommodated to the prescriber's intention. Let it continue in infusion in a bath, or any other slow heat, for two days, or more according as the hardness or softness of the matter requires, until the liquor is impregnated with the tincture of the thing infused. Then let the tinged liquor be separated by inclination, pouring on a fresh menstruum, infusing and separating, as before, as long as any tincture can be obtained. Let all the tinctures be put together and filtered through cap-paper, and then in a bath-heat evaporate the humidity, until the matter left is of the consistence of honey, which must be kept for use. And to this extract, for the sake of preserving it moist, must be added some portion of salt, or some other thing suitable to the main intention.

The most remarkable extracts of the London Dispensatory are, 1. Extracts of the

the roots of elecampane, gentian, black hellebore, of the leaves of rue and savine, 2. Extract of liquorice. 3. Of logwood. 4. Of peruvian bark, both soft and hard. 5. Of lignum vitæ, both soft and hard. 6. Of jalap. And, 7. The cathartic extract which is prepared from proof spirit poured upon a proper quantity of succotrine aloes, the pith of coloquintida, scammony, and the lesser cardamom-seeds husked. The thebaic extract consists only of opium dissolved in water, strained and evaporated to a consistence. Let it be remarked, that all watery extracts should be moistened or sprinkled with a little spirit of wine, to prevent their growing mouldy.

EXTRACT, in matters of literature, is something copied or collected from a book or paper.

EXTRACTS of writings or records, are notes upon them. See ESTREAT.

EXTRACTA CURIÆ, are the issues or profits of holding a court arising from the customary dues, fees and amercements.

EXTRACTION, in chemistry and pharmacy, the operation by which essences, tinctures, &c. are drawn from natural bodies. See the article EXTRACT.

EXTRACTION, in surgery, is the drawing any foreign matter out of the body by the hand, or by the help of instruments. In extracting arrows and such like bearded weapons used by barbarous nations, the whole business consists in drawing out the head, so as that its protuberant beards or hooks may not wound and lacerate the contiguous parts. If it appears to be lodged but superficially under the integuments, it will be best to draw it out the same way it entered, provided the wound be first sufficiently dilated by incision, in order to prevent the laceration of the adjacent parts: otherwise it must be thrust forwards, and drawn out in the direction of its point in the opposite side, if possible, an incision being first made to meet it. This last method is most eligible, when the weapon has descended very deep; so that there is much less space for it to pass onward, than to be drawn back again; and also when it has passed beyond any large bloody-vessels or nerves, so that it would induce a laceration of them to draw it back.

In extracting foreign bodies from the ear, you must first be informed by the account of the patient, and by searching with a probe, of what nature the offending body is; and if it happen to be a lump of dried indurated wax, it will be proper to inject some warm milk, or oil of olives or almonds, ordering the patient to hold his head inclined on the contrary side while you use the syringe. If a small calculus, &c. be lodged in it, you must first of all relax and mollify the passages of the ear, and then carefully extract the body with a probe or pliers. But if the foreign body should happen to be a peat bean, or other grain, which is too much swelled by the humours to be discharged intire by the probe, or other instrument, you must break it with pliers, or cut it with small scissars, and extract it bit by bit. Sometimes an insect gets into the ear, and by struggling to get loose from the glutinous ear-wax, excites an intolerable pruritus and tickling, which in time turns to acute pain. When the insect can be perceived, it may be drawn out by a probe, &c. but if that fails, you must inject warm oil, of spirit of wine, which will quickly kill the insect, and then you may wash it out with the same or some other liquor, and afterwards cleanse the cavity of the ear with a bit of cotton or lint upon the end of your probe.

To extract bodies fallen into the eyes, the first and most easy method is by agitating and extending the eye-lids with one's fingers, holding the head down at the same time, by which means the increased flux of tears excited by the vellicating body, very often washes it out of the eye without much difficulty. But if this method does not succeed, the next remedy is to blow some levigated pearl or crab claws through a quill under the eye-lid, that as these are washed out by tears, they may also take the foreign body with them, otherwise the surgeon must take the small round head of a slender probe, or the end of a tooth-pick, and extending the eye-lids gently from the eye, carefully extract the offending body. Lime or any acrid salt may be washed from the eyes by a pencil brush of soft feathers, or a bit of fine sponge softened in a quill, dipped in warm water.

The method of extracting small bones of fish, needles, pins, &c. sticking in the fauces or gula, is as follows. When the offending body cannot be removed by taking a large draught of some liquor, or swallowing a large mouthful of bread, &c. recourse must be had to some instrument. The tongue is first to be depressed with a spatula, in order to observe whether the obstacle can be seen; and if it appears near the upper part of the oesophagus,

phagus, it ſhould be cautiouſly extracted with a pair of pliers, or ſome ſuch inſtrument. But if it is lodged deep in the oeſophagus, the ſurgeon may then give the patient a piece of ſponge to ſwallow, that has firſt been dipt in oil, and well faſtened to a ſtrong cord, by which it is to be pulled up again, after it has been ſwallowed by the patient as far as it will go; by which means the body ſticking in the oeſophagus, will be either forced down into the ſtomach, or elſe drawn up into the mouth.

For the extraction of bullets, *&c.* from wounds. See GUN-SHOT WOUNDS.

EXTRACTION, in genealogy, implies the ſtock or family from which a perſon is deſcended.

EXTRACTION *of roots*, in algebra and arithmetic, the method of finding the root of any power or number. See the articles, ROOT, SQUARE, CUBE, *&c.*

The reader will perceive by the articles involution and power, that the extraction of roots, or the reſolving of powers into their roots, is the reverſe of involution, and conſequently that the roots of ſingle quantities are eaſily extracted by dividing their exponents by the number that denominates the root required; for the powers of any root are found by multiplying its exponent by the index that denominates the power; and therefore, when any power is given, the root muſt be found by dividing the exponent of the given power by the number that denominates the kind of root that is required. Thus the ſquare root of a^8 is $a^{\frac{8}{2}}=a^4$; and the ſquare root of $a^4 b^8 c^2$, is $a^2 b^4 c$. The cube root of $a^6 b^3$, is $a^{\frac{6}{3}} b^{\frac{3}{3}}=a^2 b$; and the cube root of $x^9 y^6 z^{12}$, is $x^3 y^2 z^4$. It will alſo appear from what we ſhall ſay of involution, that any power that has a poſitive ſign, may have either a poſitive or negative root, if the root is denominated by an even number. Thus the ſquare root of $+a^2$ may be $+a$ or $-a$, becauſe $+a \times +a$ or $-a \times -a$ gives $+a^2$ for the product. But if a power have a negative ſign, no root of it denominated by an even number can be aſſigned, ſince there is no quantity that multiplied into itſelf an even number of times can give a negative product. Thus the ſquare root of $-a^2$ cannot be aſſigned, and is what we call an impoſſible or imaginary quantity. See the article ROOT.

But if the root to be extracted is denominated by an odd number, then ſhall the ſign of the root be the ſame as the ſign of the given number whoſe root is required. Thus the cube root of $-a^3$ is $-a$, and the cube root of $-a^6 b^3$, is $-a^2 b$. If the number that denominates the root required is a diviſor of the exponent of the given power, then ſhall the root be only a lower power of the ſame quantity. As the cube root of a^{12} is a^4, the number 3 that denominates the cube root being a diviſor of 12. But if the number that denominates what ſort of root is required is not a diviſor of the exponent of the given power, then the root required ſhall have a fraction for its exponent: thus the ſquare root of a^3 is $a^{\frac{3}{2}}$, the cube root of a^5 is $a^{\frac{5}{3}}$, and the ſquare root of a itſelf is $a^{\frac{1}{2}}$. Theſe powers that have fractional exponents, are called imperfect powers or ſurds, and are multiplied and divided, involved and evolved, after the ſame manner as perfect powers. Thus the ſquare of $a^{\frac{3}{2}}$ is $a^{2 \times \frac{3}{2}}=a^3$; and the cube of $a^{\frac{2}{5}}$ is $a^{3 \times \frac{2}{5}}=a^{\frac{6}{5}}$. The ſquare root of $a^{\frac{2}{3}}$ is $a^{\frac{2}{3 \times 2}}=a^{\frac{1}{3}}$; and the cube root of $a^{\frac{3}{4}}$ is $a^{\frac{1}{4}}$. See the article SURD.

The ſquare root of any compound quantity, as $a^2+2ab+b^2$, is diſcovered after this manner. Firſt take care to diſpoſe the terms according to the dimenſions of the alphabet, as in diviſion; then find the ſquare root of the firſt term aa, which gives a for the firſt member of the root. Then ſubtract the ſquare from the propoſed quantity, and divide the firſt term of the remainder $2ab+b^2$, by the double of that member, *viz.* $2a$, and the quotient b is the ſecond member of the root. Add this ſecond member to the double of the firſt, and multiply their ſum $2a+b$ by the ſecond member b, and ſubtract the product $2ab+b^2$ from the foreſaid remainder $2ab+b^2$, and if nothing remains, then the ſquare root is obtained. The manner of the operation is thus:

$$a^2+2ab+b^2 \;(a+b$$
$$a^2$$
$$2a+b \;)\; 2ab+b^2$$
$$\times b \;)\; 2ab+b^2$$
$$0. \quad 0.$$

But if there had been a remainder, you muſt have divided it by the double of the ſum of the two parts already found, and the quotient would have given the third member of the root. Thus if the quantity propoſed had been $a^2+2ab+2ac+b$

$+b^2+2bc+c^2$, after proceeding as above you would have found the remainder $2ac+2bc+c^2$, which divided by $2a+2b$, gives c to be annexed to $a+b$, as the third member of the root. Then adding c to $2a+2b$, and multiplying their sum $2a+2b+c$ by c, subtract the product $2ac+2bc+c^2$ from the foresaid remainder; and since nothing now remains, you conclude that $a+b+c$ is the square root required.

The operation is thus:

$$a^2+2ab+2ac+b^2+2bc+c^2\ (\ a+b+c$$
$$a^2$$
$$2a+b)\ 2ab+2ac+b^2+2bc+c^2$$
$$\times b)\ 2ab \quad +b^2$$
$$2a+2b+c)\ 2ac+2bc+c^2$$
$$\times c)\ 2ac+2bc+c^2$$
$$0. \quad 0. \quad 0.$$

Another example. Required the square root of $xx-ax+\frac{1}{4}aa$

$$xx-ax+\tfrac{1}{4}aa\ (\ x-\tfrac{1}{2}a$$
$$xx$$
$$2x-\tfrac{1}{2}a)\ -ax+\tfrac{1}{4}aa$$
$$\times -\tfrac{1}{2}a)\ -ax+\tfrac{1}{4}aa$$
$$0. \quad 0.$$

The square root of any number is found out after the same manner. If it is a number under 100, its nearest square root is found by the following table, by which also its cube root is found, if it be under 1000, and its biquadratic, if it be under 10000.

Root	1	2	3	4	5	6	7	8	9
Square	1	4	9	16	25	36	49	64	81
Cube	1	8	27	64	125	216	343	512	729
Biquad.	1	16	81	256	625	1296	2401	4096	6561

But if it is a number above 100, then its square root will consist of two or more figures, which will be found by different operations by the following rule. Place a point above the number that is in the place of units; pass the place of tens, and place again a point over that of hundreds; and go on towards the left hand, placing a point over every second figure, and by these points the number will be distinguished into as many parts as there are figures in the root. Then find the square root of the first part, and it will give the first figure of the root, subtract its square from that part, and annex the second part of the given number to the remainder. Then divide this new number (neglecting its last figure) by the double of the first figure of the root; annex the quotient to that double, and multiply the number thence arising by the said quotient; and if the product is less than your dividend, or equal to it, that quotient shall be the second figure of the root. But if the product is greater than the dividend, you must take a less number for the second figure of the root than that number. Much after the same manner may the other figures of the quotient be found, if there are more points than two placed over the given number.

To find the square root of 99856, I first point it thus, $\dot{9}98\dot{5}6$ $\dot{9}9\dot{8}5\dot{6}$, then I find the square root of 9 to be 3, which therefore is the first figure of the root. I subtract 9 the square of 3 from 9, and to the remainder I annex the second part 98, and I divide (neglecting the last figure 8) by the double of 3 or 6, and I place the quotient after 6, and then multiply 61 by 1, and subtract the product 61 from 98. Then to the remainder 37, I annex the last part of the proposed number (56) and by dividing 3756 (neglecting the last figure 6) by the double of 31, that is by 62, I place the quotient after, and multiplying 626 by the quotient 6, I find the product to be 3756, which subtracted from the dividend, and leaving no remainder, the exact root must be 316.

Examples.

$$\dot{9}9\dot{8}5\dot{6}\ (\ 316$$
$$9$$
$$61)\ 98$$
$$\times 1)\ 61$$
$$626)\ 3756$$
$$\times 6)\ 3756$$
$$0$$

$$\dot{2}7\dot{3}9\dot{4}7\dot{5}6\ (\ 5234$$
$$25$$
$$102)\ 239$$
$$\times 2)\ 204$$
$$1043)\ 3547$$
$$\times 3)\ 3129$$
$$10464)\ 41856$$
$$\times 4)\ 41856$$
$$0$$

$$\dot{5}2\dot{9}\ (\ 23$$
$$4$$
$$43)\ 129$$
$$\times 3)\ 129$$
$$0$$

In general, to extract any root out of any given quantity: first range that quantity according to the dimensions of its letters, and extract the said root out of the first term, and that shall be the first member of the root required. Then raise this root to a dimension lower by unit than the number that denominates the root required, and multiply the power that arises by that number itself; divide the second term of the given quantity by the product, and the quotient shall give the second member of the root required. Thus to extract the root of the fifth power out of $a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$, I find that the root of the fifth power out of a^5, gives a; which I raise to the fourth power, and multiplying by 5, the product is $5a^4$; then dividing the second term of the given quantity $5a4b$ by $5a^4$, I find b to be the second member; and raising $a + b$ to the fifth power and subtracting it, there being no remainder, I conclude that $a + b$ is the root required. If the root has three members, the third is found after the same manner from the first two considered as one member, as the second member was found from the first, which may easily be understood from what was said of extracting the square root.

In extracting roots, it will often happen that the exact root cannot be found in finite terms. Thus the square root of $a^2 + x^2$ is found to be $a + \frac{x^2}{2a} - \frac{x^4}{8a^3} + \frac{x^6}{16a^5} - \frac{5x^8}{128a^7} + \&c. \&c.$

The operation is thus:

$$a^2 + x^2 \left(a + \frac{x^2}{2a} - \frac{x^4}{8a^3} + \frac{x^6}{16a^5} - \&c.\right.$$
$$a^2$$
$$\left.2a + \frac{x^2}{2a}\right) * + x^2$$
$$\left.\times \frac{x^2}{2a}\right) = x^2 + \frac{x^4}{4a^2}$$
$$\left.2a + \frac{x^2}{a} - \frac{x^4}{8a^3}\right) - \frac{x^4}{4a^2}$$
$$\left.\times - \frac{x^4}{8a^3}\right) = -\frac{x^4}{4a^2} - \frac{x^6}{8a^4} + \frac{x^8}{64a^6}$$
$$+ \frac{x^6}{8a^4} - \frac{x^8}{64a^6}, \&c. \&c.$$

After the same manner, the cube root of $a^3 + x^3$ will be found to be $a + \frac{x^3}{3a^2} - \frac{x^6}{9a^5} + \frac{5x^9}{81a^8} - \frac{10x^{12}}{243a^{11}} + \&c.$

The reader will find a general theorem for extracting the root of any binomial under the article BINOMIAL.

The roots of numbers are to be extracted as those of algebraic quantities. Place a point over the units, and then place points over every third, fourth, or fifth figure towards the left hand, according as it is the root of the cube, of the fourth or fifth power that is required; and if there be any decimals annexed to the number, point them after the same manner, proceeding from the place of units towards the right hand. By this means the number will be divided into so many periods, as there are figures in the root required. Then enquire which is the greatest cube, biquadrate, or fifth power in the first period, and the root of that power will give the first figure of the root required. Subtract the greatest cube, biquadrate, or fifth power from the first period, and to the remainder annex the first figure of your second period, which shall give your dividend. Raise the first figure already found to a power less by unit than the power whose root is sought, that is, to the second, third, or fourth power, according as it is the cube root, the root of the fourth, or the root of the fifth power that is required, and multiply that power by the index of the cube, fourth or fifth power, and divide the dividend by this product, and the quotient will be the second figure of the root required.

Raiſe the part already found of the root, to the power whoſe root is required, and if that power be found leſs than the two firſt periods of the given number, the ſecond figure of the root is right; but if it be found greater, you muſt diminiſh the ſecond figure of the root, till that power be found equal to or leſs than thoſe periods of the given number. Subtract it, and to the remainder annex the next period, and proceed till you have gone through the whole given number; finding the third figure by means of the two firſt, as you found the ſecond by the firſt, and afterwards finding the fourth figure (if there be a fourth period) after the ſame manner from the three firſt.

Thus to find the cube root of 13824, point it 13824: find the greateſt cube in 13, *viz.* 8, whoſe cube root 2 is the firſt figure of the root required. Subtract 8 from 13, and to the remainder 5 annex 8, the firſt figure of the ſecond period; divide 58 by triple the ſquare of 2, *viz.* 12, and the quotient is 4, which is the ſecond figure of the root required, ſince the cube of 24 gives 13824, the number propoſed.

Operation.

13824(24
8=2×2×2
3×4=12)58(4
Subtract 24×24×24=13824
Rem. 0

After the ſame manner the cube root of 13312053, is found to be 237.

Operation.

13312053(237
8=2×2×2
12)53(4 or 3
Subtract the cube of 23=12167
3×23×23=1587)11450(7
Subtract the cube of 237=13312053
0

In extracting of roots, after you have gone through the number propoſed, if there is a remainder, you may continue the operation by adding periods of cyphers to that remainder, and find the true root in decimals to any degree of exactneſs required.

For the method of extracting the root of any affected equation. See the article *Quadratic* EQUATION, &c.

EXTRACTOR, in midwifery, an inſtrument, or forceps, for extracting children by the head. See DELIVERY.

EXTRAORDINARII, in roman antiquity, a body of forces conſiſting of a third part of the horſe and a fifth part of the foot, which was ſeparated from the reſt, with great policy and caution, to prevent any deſign that they might poſſibly entertain againſt the natural forces. A ſelect body of ſoldiers, choſen from among the extraordinarii, were thoſe called ablecti. See the article ABLECTI.

EXTRAVAGANTES, thoſe decretal epiſtles, which were publiſhed after the clementines.

They were ſo called becauſe, at firſt, they were not digeſted, or ranged, with the other papal conſtitutions, but ſeemed to be, as it were, detached from the canon law. They continued to be called by the ſame name when they were afterwards inſerted in the body of the canon law. The firſt extravagantes are thoſe of John XXII. ſucceſſor of Clement V. the laſt collection was brought down to the year 1483, and was called the common extravagantes, notwithſtanding that they were likewiſe incorporated with the reſt of the canon law. See the article DECRETAL.

EXTRAVASATION, in contuſions, fiſſures, depreſſions, fractures, and other accidents of the cranium, is when one or more of the blood-veſſels that are diſtributed on the dura mater, is broke or divided, whereby there is ſuch a diſcharge of blood as greatly oppreſſes the brain, and diſturbs its offices; frequently bringing on violent pains, and other miſchiefs; and at length, death itſelf, unleſs the patient is timely relieved. See the articles CONTUSION, FISSURE, and FRACTURE.

If the extravaſated quantity of blood be ever ſo ſmall, it will certainly corrupt, and affect the meninges, and the brain itſelf, with the ſame diſorder: from hence will proceed violent inflammations, deliriums, ulcers, &c. and even death itſelf, ſooner or later. And this will frequently be the caſe, after a violent blow upon the cranium, though the bone ſhould eſcape without any injury. In this caſe the blood is ſpilt either between the cranium, and dura mater, or between the dura mater and pia mater, or between the pia mater and the brain, or laſtly, between the ſinuſes of the brain. Each of theſe caſes are attended with great danger, but the deeper the extravaſation happens,

happens, so much greater will the danger be. See the article WOUND.

You may suspect that blood is extravasated in the cavity of the cranium, from the violence of the symptoms which succeed, if the patient lies still without sense or motion, if blood flows from the mouth or nose, if the eyes are much inflamed and swelled, if vomiting succeeds; and when upon the remission of these symptoms the patient complains of a remarkable heaviness of the head, a sleepiness, vertigo, blindness, spasms, *&c.* When the quantity of extravasated blood is very considerable the patient dies on the spot.

If no fissure or contrafissure in the cranium, nor any external injury appear on the head after a violent blow, then, in order to find out in what part of the head the extravasation is seated, it will be proper to shave the head all over, and if no mark of a stagnation of blood appears, cover the head with an emollient plaster, laying over it medicated bags well heated, which will, in a few hours, produce tumour, and softness upon the injured part. See the article CONTRA-FISSURE.

When the seat of the injury is discovered, the first intention is to discharge the extravasated blood, for which intent many advise the use of the trepan: but as that should not be attempted, unless in a case of absolute necessity, 'tis best to try first the use of attenuating and dividing medicines. See the articles TREPAN and ATTENUANTS.

With this intention, open a vein, and draw away as much blood as the strength of the patient will admit; prescribe a brisk purge, or sharp clysters; foment the head with medicated bags, and apply a melilot plaster to it; give frequently attenuating warm fluids: the operation of bleeding must be repeated, especially if the patient is young and athletic.

EXTRAVASATION of *blood betwixt the flesh and the skin*, in phlebotomy, the same with ecchymosis. See ECCHYMOSIS.

EXTREMES, in logic, the terms expressing the two ideas whose relation we enquire after in a syllogism. See the article SYLLOGISM.

EXTREME *and mean proportion*, in geometry, is when a line A B, (plate XCIV. fig. 2.) is so divided in F, that the rectangle under the whole line AB, and the lesser segment F B, is equal to the square of the greater segment A F.

Let a square be formed upon the line A B, and one of its sides A C be equally divided in the point D; draw DB, and take the line D G equal to the line B D, then the square A G H F will be equal to the rectangle F E.

For since the line A C is equally divided in the point D, and is lengthened by the line AG, the rectangle C H, together with the square of the line A D, will (by 6. 2. of each) be equal to the square of the line D G or D B. But the square A E, with the square of the line A D, is also equal (47. 1.) to the square of the line D B. Therefore the square A E is equal to the rectangle C H. Taking then away from both the rectangle C F, the rectangle F E will be equal to the square F G.

But no number can be so divided into two parts, as is well demonstrated by Clavius, in his commentaries upon lib. 9. of Euclid; which is evident enough thus: Let a be the number, and x the greater part; then the lesser part will be $a-x$, and so $aa - ax = xx$, and

thence $x = \frac{a + a\sqrt{5}}{2}$.

square root of 5 cannot be had in numbers exactly, it is plain that the value of x partly consisting of the square root, multiplied by a, cannot be had exactly in numbers neither.

EXTREME UNCTION. See UNCTION.

EXTREMUM *clausit diem*, in law. See the article DIEM.

EXTRINSIC, among metaphysicians, is taken in various senses: sometimes it signifies a thing's not belonging to the essence of another; in which sense, the efficient cause and end of a thing are said to be extrinsic. Sometimes it signifies a thing's not being contained within the capacity of another; in which sense these causes are called extrinsic, which introduce something into a subject from without, as when a fire introduces heat. Sometimes it signifies a thing added or applied to another, in which sense accidents and adherents are said to be extrinsic to the subjects to which they adhere. Sometimes the vision is said to be extrinsic from some form which does not exist in that thing, but is adjacent to it, or by some means or other without it. See the article INTRINSIC.

EXULCERATION, in furgery. See the article ULCER.

EXUVIÆ, among naturalifts, denote the caft off parts, or coverings, of animals, as the fkins of ferpents, caterpillars, and other infects. See the articles SERPENT and CATERPILLAR.

Mr. Reaumur is very particular in defcribing the manner in which the caterpillar tribe throw off, or extricate themfelves from, their exuviæ. See vol. i. of his Hiftory of Infects.

The crab, as is well known, can even throw off its limbs at pleafure, which are again replaced by new ones,. See the article CANCER.

EXUVIÆ is alfo ufed for the remains of fea-animals, found foffile, and more properly called extraneous, or marine foffils. See the article FOSSIL.

EYE, *oculus*, in anatomy, the organ of fight; or that part of the body, whereby vifible objects are reprefented to the mind. With regard to the eyes, we are to obferve firft, their fituation, which is in the upper part of the face, to the end that we may be able to fee at a greater diftance than otherwife we could. Secondly, their figure, which, excepting for the internal parts, is globular; and thirdly, their colour, which in the human fpecies is variable; fome being black, others greyifh, and others bluifh.

The parts which do not enter into the compofition of the eye, but are deftined for the affiftance of feeing, are the eyebrows, the eye-lids, and the mufcles of the eyes.

The eye-lids, palpebræ, are the integuments of the eyes: there are two of them to each, an upper, and an underlid; and, at their joining, there are formed two corners, called canthi, an interior and larger, and an exterior and fmaller; they are capable of clofing and opening at pleafure, by means of mufcles. They are compofed of the epidermis, the cutis, which is there very thin, and an arched cartilage, called the tarfus of the eye-lid; and are lined on the inner furface with a fine and delicate foft membrane, very fenfible and continuous to the periofteum, and to the albuginea of the eye.

The eye-lafhes, cilia, are certain rigid hairs, fituated on the arch or tarfus of the eye-lids, and bent in a very fingular manner; they are deftined for keeping external bodies out of the eye, and for moderating the influx of light.

The glaudulæ febaceæ are fituated in the interior furface of the eye-lids: they ferve for the fecretion of an oleaginous fluid, which is of great ufe in preventing the attrition of the eye-lids, from their continual motion.

After this we obferve the caruncula lachrymalis. See the article CARUNCULA.

The glandula lachrymalis is fituated in the orbit, above the fmaller angle, with its excretory ducts under the upper eyelid, and the puncta lachrymalia are two. See the article LACHRYMAL.

The ufe of the eye-lids is to cover and defend the eyes; to wipe off foulnefs from the cornea; to moderate the influx of light, at pleafure; and, by their frequent motion, to occafion a fecretion of a neceffary fluid from the glands.

The mufcles of the eyes, ferving to their motions, are in the human frame fix in number: four ftraight, *viz.* the attollens, deprimens, adductor, and abductor; and two oblique, the fuperior and inferior. See the articles MUSCLE, ATTOLLENS, &c.

Between, and among thefe, there is a confiderable quantity of fat ferving for various very important purpofes.

The proper parts of the eye, which form its globe, or bulb, are its coats, or tunics, the humours and the veffels.

The coats of the eye are feveral. 1. The albuginea, adnata, or conjunctiva. 2. The cornea. 3. The fclerotic, in which what is called the aquæducts of Nuck are to be obferved. 4. The choroides. 5. The uvea, wherein we are to obferve, 1. Its anterior coloured furface, called the iris, which is intirely vafcular, and from which arifes the variety of colours in the human eyes. 2. The pupil or foramen, which is round in the human eye, is nearly in the middle of the iris, and is capable of dilatation and contraction. 3. Its pofterior furface, which is black, and in which, when this blacknefs is cleared away, there appears the fphincter of the pupil, formed of circular fibres for contraction; the ciliary fibres, or proceffes for the dilatation of the pupil; the ciliary ligament for the motion of the vitreous and cryftalline humours; the arterial and venal circles, from which the veffels are in a wonderful manner diftributed over the uvea; the choroides; the ligamentum ciliare; and the vitreous and cryftalline humours; the ductus nigri, fo called from their black colour, placed between the proceffes

ceſſes and the ligamentum ciliare; the ſpace between the uvea and the cornea, called the anterior camera of the eye; and that between the uvea and the cryſtalline, called its poſterior camera, which is either much ſmaller or intirely wanting. Many authors have attributed glands to the uvea, but they are very difficult to be diſtinguiſhed, if there be any. See the articles ALBUGINEA, CORNEA, SCLEROTICA, &c.

Finally, we are to mention the retina, which is a very delicate tender, and as it were, mucous coat of the eye; or, more properly, it is only an expanſion of the optic nerve at the bottom of the eye: it is a primary part of the eye, and the great organ of viſion, for the ſake of which all the reſt were formed. See the article RETINA.

The humours of the eye are generally eſtabliſhed to be three; their office is to ſerve for the expanſion of the coats, and for the refraction of the rays of light, they are diſtinguiſhed by the names of aqueous, vitreous, and cryſtalline. See the articles AQUEOUS, VITREOUS, and CRYSTALLINE.

After theſe three humours of the eye, we obſerve the tunica arachnoides: this as an extremely thin and fine viſculous membrane, which ſurrounds the cryſtalline and the vitreous humour, and by the aſſiſtance of which the cryſtalline lens is lodged in the fovea of the vitreous humour. On the cutting or breaking of this membrane, the cryſtalline falls out.

The blood-veſſels are next to be conſidered: theſe are diſtributed in an amazing manner through the internal parts of the eye. Arteries from the internal and external carotids go to the eye in many different parts. There are alſo numbers of extremely minute ones, which convey only a fine and ſubtile lymph thither, by which means the tunics and humours of the eye are nouriſhed; the veins partly carry the blood back to the ſinuſes of the dura mater, and partly to the jugulars.

Beſides theſe veſſels, Valſalva aſſures us, that he diſcovered a number of true and proper lymphatics in the eye of an ox.

The nerves of the eye are very numerous: beſides the optic nerve, which, by its expanſion forms the retina, and enters the eye from the ſide of the noſe, there are the third and fourth pair of the brain, and a fifth and ſixth branch diſtributed about the muſcles, membranes, eye-lids, and lachrymal ſacculus and gland. See the article NERVE.

Motions of the EYE are either external or internal. The external motion is that performed by its four ſtraight and two oblique muſcles, whereby the whole globe of the eye changes its ſituation or direction. The ſpherical figure of our eyes, and their looſe connection to the edge of the orbit, by the tunica conjunctiva, which is ſoft, flexible and yielding, does excellently diſpoſe them to be moved this, or the other way, according to the ſituation of the object we would view. By the membranes already deſcribed, the eye is connected to the edge of the orbit, which being ſoft and flexible, they do in ſuch a manner, as not in the leaſt to impede its neceſſary motions; and that great quantity of fat placed all round the globe, betwixt it and the orbit, lubricates and ſoftens the eye, and renders its motions more eaſy: hence ariſe the three following remarkable obſervations. 1. When nature has denied the head any motion, it is obſervable, that ſhe has, with great care and induſtry, provided for this defect. To this purpoſe belongs the ſurprizing beautiful and curious mechaniſm obſervable in the immoveable eyes of flies, waſps, &c. They nearly reſemble two protuberant hemiſpheres, each conſiſting of a prodigious number of other little ſegments of a ſphere, all which ſegments are perforated by a hole, which may be called their pupil, in which this is remarkable, that every foramen, or pupil, is of a lenticular nature, ſo that we ſee objects through them topſy-turvy, as through ſo many convex glaſſes: yea, they become a ſmall teleſcope, when there is a due focal diſtance between them and the lens of the microſcope by which they are viewed. Leuwenhoek's obſervations make it probable, that every lens of the cornea ſupplies the place of the cryſtalline humour, which ſeems to be wanting in thoſe creatures, and that each has a diſtinct branch of the optic nerve anſwering to it, upon which the images are painted, ſo that as moſt animals are binocular, and ſpiders for the moſt part octonocular, ſo flies, &c. are multocular, having in effect as many eyes as there are perforations in the cornea, by which means, as other creatures but with two eyes are obliged, by the contraction of the muſcles above enumerated, to turn their

their eyes to objects, these have some or other of their pupils always ready placed towards objects nearly all around them: whence they are so far from being denied any benefit of this noble and most necessary sense of sight, that they have probably more of it than other creatures, answering to their necessities and ways of living.

II. As in man, and most other creatures, the eyes are situated in the head, because, among other reasons, it is the most convenient place for their defence and security, being composed of hard bones, wherein are formed two large, strong sinuses, or sockets, commonly called orbits, for the convenient lodging of these tender organs, and securing them against external injuries; so in those creatures whose head, like their eyes and the rest of their body, is soft and without bones, nature hath provided for this necessary and tender organ, a wonderful kind of guard, by enduing the creature with a faculty of withdrawing his eyes into his head, and lodging them in the same safety within his body. We have a very beautiful example of this in snails, whose eyes are lodged in four horns, like atramentous spots, one at the end of each horn, which they can retract at pleasure, when in any danger. Here it may be also observed, that the hardness of the cornea in all animals that want eye-lids, as fishes, exactly resembles the horn of a lanthorn; and therefore is not hurt by such particles as their eyes are commonly exposed to. And in the mole, because this animal lives under ground, it was necessary its eyes should be well guarded and defended against the many dangers and inconveniencies to which its manner of living exposes it: this is the reason why its eyes are so small, and that they are situated so far in the head, and covered so strongly with hair; and besides they can protrude, and retract them at pleasure.

III. The third and last reflection we shall make upon the external motion of our eyes, is what regards a problem which has very much perplexed both physicians and philosophers, *viz.* What is the cause of the uniform motion of both eyes.

In some creatures, such as fishes, birds, and among quadrupeds, the hare, cameleon, *&c.* the eyes are moved differently; the one towards one object, and the other towards another. But in man, sheep, oxen, and dogs, the motions are so uniform, that they never fail to turn both towards the same place; hence in operations upon the eye that require it to be kept immoveable, sometimes it is necessary to tie up the sound eye with a compress, by which means the other is easier kept fixed and immoveable.

The final cause of this uniform motion is, 1. That the sight may be thence rendered more strong and perfect: for since each eye apart impresses the mind with an idea of the same object, the impression must be more strong and lively, when both eyes concur; and that both may concur, it is necessary that they move uniformly; for though the retina, or immediate object of vision, be expanded upon the whole bottom of the eye, as far as the ligamentum ciliare, yet nothing is clearly and distinctly seen, but what the eye is directed to. 2. A second advantage we reap from the uniform motion of the eyes, which is more considerable than the former, consists in our being thereby enabled to judge with more certainty of the distance of objects. See the article VISION.

There is yet another advantage, full as considerable as any of the former, that is thought to arise from the uniform motion of our eyes, and that is, the single appearance of objects seen with both our eyes; which, though at first view it does not appear probable, is true: for if in looking at an object, you impress one of your eyes aside with your finger, and alter its direction, every thing will be seen double.

By the internal motions of the eye, we understand those motions which only happen to some of its internal parts, such as the crystalline and iris; or to the whole eye, when it changes its spherical figure, and becomes oblong or flat. The internal motions of our eyes are either such as respect the change of conformation, that is necessary for seeing distinctly, at different distances, or such as only respect the dilatation and contraction of the pupil.

That our eyes change their conformation, and accommodate themselves to the various distances of objects, will be evident to any person, who but reflects on the manner and most obvious phænomena of vision.

Authors are very much divided in their opinions with regard to the mechanism by

by which this change is introduced, as well as what parts it confifts in: for fome are of opinion, that the whole globe changes its form, by being lengthened into an oblong figure, when objects are near, and, by becoming flat, when they are removed to a greater diftance; and others are of a quite contrary opinion.

With regard to the change of the cryftalline, and the mechanifm by which it is produced, fome maintain, that according as objects are at different diftances, this humour becomes more or lefs convex, which does indeed very well account for diftinct vifion at all diftances; for objects painted on a fheet of white paper, by means of a lens placed in the hole of a window-fhuter, in a dark room, have their images always diftinct, at whatever diftance they be from the window, provided that the lens be of a convexity anfwerable to that diftance. See the article LENS, *&c.*

Others again are of opinion that the cryftalline never changes its figure, but that it is moved to and from the retina, according to the diftance or proximity of the object in view, and this alfo does equally well account for the diftinct appearance of objects at all diftances, as is evident from the laws of optics.

Difeafes of the EYE are, an ophthalmia, or inflammation of the eyes; the gutta ferena, or amaurofis; a fuffufion, or cataract; an ectropium; a glaucoma; an amblyopia, or obfcurity of fight, containing the myopia, the prefbytopia, the nyctalopia, and the amaurofis; the ftrabifmus, or fquinting; an unguis, pannus, or pterygium of the membrane of the eye; the albugo, leucoma, or fpot in the eye; a fugillation of the eye; an epiphora, or rheum in the eyes; a trichiafis, and the fiftula lachrymalis. See each difeafe under its refpective name.

Atoms and flies appearing before the EYES. Thefe images, or appearances, arife before the eyes from an obftruction of the optic nerve, from the fine fibres of the retina, or from the fmall veins contained therein, that is, they feem to be too much dilated, and are cured with difficulty; and efpecially if they are inveterate, becaufe they are often the forerunners of a gutta ferena; in the beginning they may be cured with fuch things as open obftructions, efpecially thofe medicines mentioned in the cure of the gutta ferena. See GUTTA SERENA.

Defluxion on the EYE. For a watery eye, if it arifes from a weaknefs of the lachrymal gland, it will be proper to ufe ftrengtheners externally, as fpirit of wine, Hungary water, fpring water, fennel, or Valerian water, wherewith the parts adjoining are to be wafhed. Internally the abounding ferum muft be evacuated, or revulfed: if it be too fharp, it muft be corrected by balfamics, and medicines againft catarrhs, fuch as effence of amber, and decoction of the woods. The revulfion muft be made by blifters and iffues.

Wounds in the EYES. If the eye is wounded, but not fo as to let out the vitreous or cryftalline humour, the following method will be of great fervice. The wound fhould be anointed, two or three times in a day, with a feather, or fine rag, well dipped in unguentum alabaftrinum; and afterwards, a fmall comprefs laid over it, being well faturated with a collyrium, made of the whites of two eggs, two ounces and a half of rofe water, half a drachm of oil of rofes, and three grains of camphor, well mixed together. The bowels fhould alfo be kept loofe for fome days, with cooling and opening medicines: if the patient is of a plethoric habit, blood fhould be drawn from the neck or feet; all warm or fharp things fhould be thrown out of the patient's diet, and great care taken to keep him quiet. When the cryftalline humour fticks in the orifice of the wound, it fhould be pulled out, that it may not bring on any deformity, or other mifchief. When the vitreous and cryftalline humours are fallen out of the eye, not only the fight but figure of the eye muft be entirely deftroyed, therefore, at firft, it fhould be dreffed with compreffes dipped in warm wine, and afterwards with fome vulnerary balfam.

Contufions of the EYE. When the eye is contufed by any accident, it will be intirely deprived of fight, except the contufion is very fmall, and proper remedies are inftantly applied. If the eye therefore has received a flight contufion, you may wafh it frequently, for the firft day, with cold fpring water, covering it with linen rags, wet with the fame. On the next day, rub it externally with camphorated fpirit of wine, covering it with ftups wrung out of vinous decoctions of eye-bright, fpeedwell, hyffop, fage, camomile-flowers, and fennel-feeds. If you cannot get thefe herbs, apply bolfters

bolsters dipped in warm wine, renewing them often. If the contusion is large, or the patient of a plethoric habit, you must open a vein.

To extract bodies fallen into the EYE. See the article EXTRACTION.

Scarification of the EYES. See the article SCARIFICATION.

Falling out of the EYE. See the article PROLAPSUS OCULI.

EYE-BROW. See the article BROW.

Artificial EYE, a kind of camera obscura. See CAMERA OBSCURA.

EYE, in architecture, is used to signify any round window, made in a pediment, an attic, the reins of a vault, or the like.

EYE *of a dome*, an aperture at the top of a dome, as that of the Pantheon at Rome, or of St. Paul's at London: it is usually covered with a lanthorn.

EYE *of the volute*, in architecture, is the center of the volute, or that point in which the helix, or spiral of which it is formed, commences: or it is the little circle in the middle of the volute, in which are found the thirteen centers for the describing the circumvolutions of it.

EYE-BROW, in architecture, is used in the same sense as list or fillet. See FILLET.

EYE, in agriculture and gardening, signifies a little bud, or shoot, inserted into a tree, by way of graft.

EYE *of a tree*, a small pointed knot to which the leaves stick, and from which the shoots or sprigs proceed.

EYE-BRIGHT. See EUPHRASIA.

EYE *of a pear*, the extremity opposite to the stalk.

EYE-FLAP, in the manege, a little piece of leather, that covers the eye of a coach-horse.

EYE *of the branch of a bridle*, the uppermost part of the branch, which is flat, with a hole in it, for joining the branch to the head-stall, and for keeping the curb fast.

EYE *of a bean*, in the manege, a black speck or mark in the cavity of the corner-teeth, which is formed there about the age of five and a half, and continues till seven or eight.

EYE *of the anchor*, on board a ship, the hole wherein the ring of the anchor is put into the shank.

EYE *of the strap*, on board a ship, the ring or round which is left of the strap to which any block is seized.

EYE, in printing, is sometimes used for the thickness of the types; or more properly, it signifies the graving in relievo on the top of the letter, otherwise called its face: the eye of the *e* is the small opening at the head of that letter, which distinguishes it from the *c*.

EYE, among jewellers, is used for the lustre and brilliancy of precious stones, more commonly called the water. See WATER.

Bull's EYE, in astronomy, the same with aldebaran. See ALDEBARAN.

EYE-GLASS, in the microscope. See the article MICROSCOPE.

Cat's EYE, in natural history, the same with asteria. See the article ASTERIA.

Crab's EYE. See the article CRAB'S EYES.

Hare's EYE. See LAGOPHTHALMIA.

EYEMOUTH, or AYMOUTH, a port-town of Scotland, about six miles north of Berwick.

EYESS, or NYESS, among sportsmen, denotes a young hawk just taken out of the nest, and not able to prey for herself. See the article HAWK.

EYNDHOVEN, a town of dutch Brabant, about fifteen miles south of Boisleduc.

EYRAC, or IZACA-ARABIC, a province of Asiatic Turky, situated on the river Euphrates, being the antient Chaldea or Babylonia.

EYRAC, or IRAC AGEM, the antient Parthia, now the principal province of Persia, is situated almost in the center of that kingdom, its capital city being Ispahan, the metropolis of the whole kingdom.

EYRE, or EIRE, in law, the court of itinerant justices. See JUSTICE.

EYSENACH, a city of Germany, in the circle of Upper Saxony: east lon. 10° 12', and north lat. 51°.

EZAN, in the mahometan theology, a hymn containing the profession of their faith, which is repeated five times a day, to call the people to prayers.

EZEKIEL, a canonical book of the Old Testament, referring chiefly to the degenerate manners and corruptions of the Jews of those times.

It abounds with fine sentences and rich comparisons, and discovers a good deal of learning in profane matters.

Ezekiel was carried captive to Babylon with Jechoniah, and began his prophecies in the fifth year of the captivity. He was contemporary with Jeremiah, who prophesied at the same time in Judea. He foretold many events, particularly the destruction of the temple, the fatal catastrophe of those who revolted from Babylon to Egypt, and the happy return of the Jews to their own land.

EZEKIEL'S REED, or ROD, a meaſure of length mentioned by that prophet, and computed to be nearly equal to two Engliſh feet.

EZRA, a canonical book of the Old Teſtament, comprehending the hiſtory of the Jews from the time of Cyrus's edict for their return, to the twentieth year of Artaxerxes Longimanus. It ſpecifies the number of Jews who returned, and Cyrus's proclamation for the rebuilding the temple, together with the laying its foundation, the obſtructions it met with, and the finiſhing thereof in the reign of Darius. The illuſtrious author of this book, was alſo the reſtorer and publiſher of the canon of the Old Teſtament. See the articles CANON and BIBLE.

F.

F the ſixth letter of the alphabet, and fourth conſonant, is by ſome reckoned a mute, and by others a ſemi-vowel: it is formed by forcing the breath out ſtrongly, and, at the ſame time, joining the upper teeth and under lip: it has much the ſame ſound with the greek φ, or *ph* in engliſh words, and is only written in words of latin origin, *ph* being uſed inſtead of it in thoſe derived from the Greek.

Suetonius tells us, that the emperor Claudius invented the *f*, and two other letters; and that it had the force of *v* conſonant, and was wrote inverted Ⅎ.

As a numeral, F denotes 40, and with a daſh over it thus F̄, 40000: in muſic, it ſtands for the baſs clef; and frequently for *forte*, as *ff* does for *forte forte*. See the articles CLEF and FORTE.

F, in medicine, ſtands for *fiat*, *let it be done*: thus F. S. A. ſtands for *fiat ſecundum artem*, let it be done according to art.

As an abbreviation, F ſtands for *filius*, *fellow*, and the like: thus F. R. S. ſignifies fellow of the royal ſociety.

FA, in muſic, one of the ſyllables invented by Guido Aretine, to mark the fourth note of the modern ſcale, which riſes thus, *ut*, *re*, *mi*, *fa*. See the articles NOTE and GAMUT.

Muſicians diſtinguiſh two *fa*'s, *viz.* the flat, marked with a b, or ♭; and the ſharp or natural, marked thus ♮, and called bquadro. See BQUADRO.

FA FINTO, a feigned F, or a feint upon that note: this is the caſe of every note that has the mark ♭ before it; but more eſpecially *mi* and *ſi*, or our E and B, and is what we commonly call the flat of any note. See the article FLAT.

FABA, the BEAN, in botany, is comprehended by Linnæus among the viciæ. See the articles VICIA and BEAN.

FABA BENGALENSIS, in the materia medica, a roundiſh compreſſed ſubſtance, about an inch in diameter, brought from Bengal, and thought to be a vitiated fruit of the myrobalans kind. It is a very good aſtringent, and therefore preſcribed with great ſucceſs in fluxes and hæmorrhages.

FABA STI. IGNATII, ST. IGNATIUS'S BEAN, in the materia medica, a dry and hard fruit, or rather kernel, preſcribed with good ſucceſs in vertigoes, lethargies, epilepſies, aſthmas, quartan agues, and worms, but ſhould be uſed with great caution. It is given in powder, 10 or 12 grains being the doſe, when intended to vomit the patient. In ſmaller quantities it acts as a ſudorific. Its tincture is ſafe even for children, and is ſaid to be one of the beſt medicines for their convulſions, and other diſorders ariſing from obſtructions of the primæ viæ.

FABA PURGATRIX, the fruit of a ſpecies of ricinus. See the article RICINUS.

FABER, in ichthyology, a fiſh of the zeus-kind, called in engliſh doree, or john doree. See the article ZEUS.

It is diſtinguiſhed from the other ſpecies of zeus by its prickly belly, and ragged appearance. Its uſual length is from ſix to ten inches, and its breadth nearly half its length. See plate XCV. fig. 1.

FABIANS, *fabii*, in roman antiquity, a part of the Luperci. See LUPERCALIA.

FABLE, *fabula*, a tale or feigned narration, deſigned either to inſtruct or divert, diſguiſed under the allegory of an action, &c.

Fables were the firſt pieces of wit that made their appearance in the world, and have

Fig. 1. FABER.

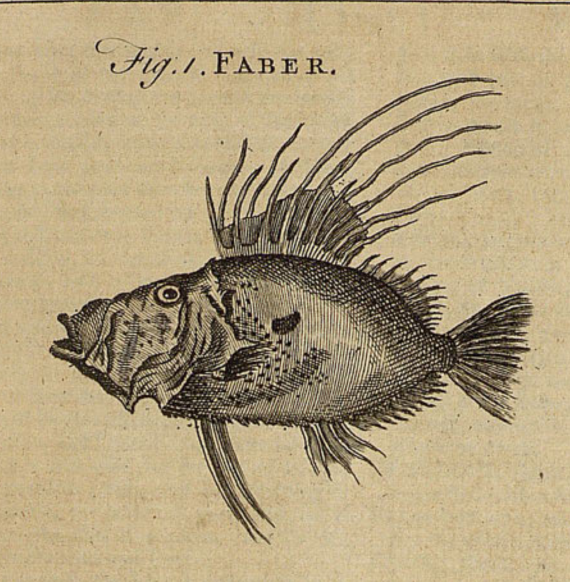


Fig. 2. FAGONIA.



Fig. 3. FALCINELLUS.

T. Jefferys sculp.

have been ftill highly valued, not only in times of the greateft fimplicity, but among the moft polite ages of the world. Jotham's fable of the trees is the oldeft that is extant, and as beautiful as any that have been made fince. Nathan's fable of the poor man is next in antiquity, and had fo good an effect as to convey inftruction to the ear of a king. We find Æfop, in the moft diftant ages of Greece; and in the early days of the roman commonwealth, we read of a mutiny appeafed by the fable of the belly and the members. As fables had their rife in the very infancy of learning, they never flourifhed more than when learning was at its greateft height; witnefs Horace, Boileau, and Fontaine. See APOLOGUE.

FABLE is alfo ufed for the plot of an epic or dramatic poem, and is, according to Ariftotle, the principal part, and, as it were, the foul of a poem. See the articles DRAMA and EPIC.

In this fenfe the fable is defined to be a difcourfe invented with art, to form the manners by inftruction, difguifed under the allegory of an action. Ariftotle divides the fable into fimple and compound: the fimple having no change of fortune; and the compound having a turn from bad fortune to good, and from good to bad. The contrivance of each fable muft have two parts, the intrigue and the difcovery. The compound fable, according to Ariftotle, pleafes moft, as having moft variety.

Lord Bacon obferves that the ufe of allegorical poetry is to envelope things, whofe dignity deferves a veil, as when the fecrets and myfteries of religion, policy, and philofophy are wrapped up in fables and parables. Others are of opinion that fable is fo effential to poetry, that there is no poetry without it; the fable being as much the form and diftinction of a poem, as the figure is to a piece of marble to denominate it a ftatue. It is requifite towards the perfection of a fable, that it be admirable and probable: however admirable the fable is, it can have no effect if it is not probable; and probability alone is too faint and dull for poetry, as what is only admirable is too extravagant and dazling. It is, therefore, of the utmoft importance to be able to know how to mingle thefe in fuch a juft temperament as may pleafe the fancy, without fhocking the reafon. The admirable is all that which is againft the ordinary courfe of nature; the probable is whatever fuits with the common opinion: but the moft part of poets, by too great a paffion to create admiration, take not fufficient care to temper it with probability. Almoft all the antient poets, however judicious otherwife, have been guilty of this fault, not to fpeak of the moderns.

FABRIC, in general, denotes the ftructure or conftruction of any thing; but particularly of buildings, as a church, hall, houfe, &c. See BUILDING.

FABRIC-LANDS, thofe formerly given towards rebuilding or repairing of cathedrals and other churches; for antiently almoft every body gave more or lefs, by his will, to the fabric of the parifh-church where he dwelt.

FABULOUS, fomething confifting of, or connected with a fable. See FABLE.

FABULOUS AGE, among antient hiftorians. See the article AGE.

FACE, *facies*, or *vultus*, in anatomy, comprehends all that part of the head which is not covered with the common long hair. See the article HEAD.

Of the parts common to the whole face are, 1. The epidermis and cutis, or fkin, the colour and finenefs of which conftitutes the principal beauty of the face. 2. The fat, which being in confiderable quantity, and frequently covered with a flefhy pannicle, adds much to the beauty of the face. The parts proper to particular parts of the face are the mufcles and bones, which are defcribed in their proper places: befides which, we may likewife refer to the face, the organs of the fenfes of feeing, hearing, tafting, and fmelling. See the articles EYE, EAR, NOSE, PALATE, MOUTH, TONGUE, &c.

To thefe may be added the forehead, cheeks, temples, &c.

The chin is nothing but the angle of the lower jaw, with its flefhy integuments. See the article MAXILLA.

FACE, or FACADE, in architecture, the front of a building, or the fide which contains the chief entrance. Sometimes, however, it is ufed for whatever fide prefents to the ftreet, garden, court, &c. or is oppofite to the eye.

FACE *of a ftone*, in mafonry, that fuperficies of it which lies in the front of the work. The workmen generally choofe to make one of thofe fides the face, which, when in the quarry, lay perpendicularly to the horizon, and confequently the breaking, not the cleaving way of the ftone.

FACE, in fortification, an appellation given to

to ſeveral parts of a fortreſs, as the face of a baſtion, *&c.* See BASTION.

The face of a place is the front comprehended between the flanked angles of two neighbouring baſtions, being compoſed of a curtain, two flanks, and two faces; and is likewiſe called the tenaille of a place. In a ſiege, the attacks are carried on againſt both baſtions, when the whole tenaille is attacked.

Prolonged FACE, that part of the line of defence-razant, which is between the angle of the ſhoulder and the curtin, or the line of defence-razant, diminiſhed by the length of the face.

FACE *of a gun*, the ſuperficies of the metal at the extremities of the muzzle of the piece.

FACE, in the military art, a word of command, intimating to turn about: thus, *face to the right*, is to turn upon the left heel a quarter-round to the right; and, *face to the left*, is to turn upon the right heel a quarter-round to the left.

FACE *of plants*, among botaniſts, ſignifies their general appearance, which, being nearly the ſame in plants of the ſame genus, ſerves to diſtinguiſh them at firſt ſight. See BOTANY, PLANT, *&c.*

The ſame term, *face*, *facies*, is uſed by other naturaliſts to denote the like reſemblance among other objects, as fiſhes, birds, *&c.* However it is proper to remark, that this reſemblance is too fallacious to ſerve as a generical character; ſince things, belonging to very different genera, are ſometimes found to be very like each other in external appearance.

FACET, or FACETTE, among jewellers, the name of the little faces or planes to be found in brilliant and roſe diamonds. See the article DIAMOND.

FACETANUS LACERTUS, the ſame with the tarantula. See TARANTULA.

FACIA, or FASCIA. See FASCIA.

FACIES *Hippocratica*, in medicine, is when the noſtrils are ſharp, the eyes hollow, the temples low, the tips of the ears contracted, the forehead dry and wrinkled, and the complexion pale or livid. The facies hippocratica is chiefly obſerved towards the period of the phthiſes, and other conſumptions, and is held a ſure prognoſtic of death.

FACK, or FAKE. See the article FAKE.

FACTION, a cabal or party formed in a ſtate, city, or company.

FACTION, in antiquity, a name given to the different companies of combatants in the circus. They were four, *viz.* the white, the red, the green, and the blue; to which Domitian added another of purple colour. They were ſo denominated from the colour of the liveries they wore, and were dedicated, according to M. Aur. Caſſiodorus, to the four ſeaſons of the year, the green being conſecrated to ſpring, the blue to winter, the red to ſummer, and the white to autumn. It appears from antient inſcriptions, that each faction had its procurators and phyſician; and from hiſtory, that party-rage ran ſo high among them, that in a diſſenſion between two factions, in the time of Juſtinian, almoſt forty thouſand men loſt their lives in the quarrel.

FACTITIOUS, any thing made by art, in oppoſition to what is the produce of nature. Thus, factitious cinnabar is oppoſed to native cinnabar. See the article CINNABAR.

FACTOR, in commerce, is an agent or correſpondent reſiding beyond the ſeas, or in ſome remote part, commiſſioned by merchants to buy or ſell goods on their account, or aſſiſt them in carrying on their trade.

A factor receives from the merchants, his conſtituents, in lieu of wages, a commiſſion or factorage, according to the uſage of the place where he reſides, or the buſineſs he tranſacts, this being various in different countries, and on the purchaſes and ſales of different commodities. He ought to keep ſtrictly to the tenor of his orders, as a deviation from them, even in the moſt minute particular, expoſes him to make ample ſatisfaction for any loſs that may accrue from his non-obſervance of them: and it is very reaſonable it ſhould be ſo, as the diſtance of his ſituation renders him unable to judge of his principal's views and intention. When unlimited orders are given to factors, and they are left to ſell or buy on the beſt conditions they can, whatever detriment occurs to their conſtituents, they are excuſed, as it is to be preſumed they acted for the beſt, and were governed by the dictates of prudence. But a bare commiſſion to ſell is not ſufficient authority for the factor to truſt any perſon, wherefore he ought to receive the money on the delivery of the goods; and, by the general power, he may not truſt beyond one, two, or three months, *&c.* the uſual time allowed in ſales, otherwiſe he ſhall be anſwerable out of his own eſtate. If a factor ſells on the uſual truſt to a perſon of good credit, who after-

wards becomes insolvent, he is discharged; but not if the man's credit was bad at the time of sale. If a factor give a man time for payment of money contracted on sale of his principal's goods, and, after that time is elapsed, sell him goods of his own for ready money, and the man becomes insolvent, the factor in equity ought to indemnify his principal, but he is not compellable by the common law. A factor should always be punctual in the advices of his transactions, in sales, purchases, freights, and more especially in draughts by exchange: he should never deviate from the orders he receives in the execution of a commission for purchasing goods, either in price, quality, or kind; and if, after goods are bought, he sends them to a different place from what he was directed to, they must remain for his own account, except the merchant, on advice of his proceedings, admits them according to his first intention. A factor that sells a commodity under the price he is ordered, shall be obliged to make good the difference: and if he purchases goods for another at a price limited, and afterwards they rise, and he fraudently takes them for his own account, and sends them to another part, in order to secure an advantage that seemingly offers, he will, on proof, be obliged, by the custom of merchants, to satisfy his principal for damages. If a factor, in conformity with a merchant's orders, buys with his money, or on his credit, a commodity he shall be directed to purchase; and, without giving advice of the transaction, sells it again to profit, and appropriates to himself the advantage, the merchant shall recover it from him, and besides have him amerced for his fraud. When factors have obtained a profit for their principal, they must be cautious how they dispose of it; for if they act without commission, they are responsible: and if a merchant remits goods to his factor, and about a month after draws a bill on him, the factor, having effects in his hands, accepts the bill, then the principal breaks, and the goods are seized in the factor's hands for the behalf of the creditors, it has been conceived the factor must answer the bill notwithstanding, and come in a creditor for so much as he was obliged, by reason of his acceptance, to pay. A factor who enters into a charter-party with a master for freight, is obliged by the contract; but if he loads aboard generally, the principal and the lading are liable for the freightment, and not the factor. If a factor, having money in his hands belonging to his principal, neglect to insure a ship and goods, according to order, if the ship miscarry, the factor, by the custom of merchants, shall make good the damage; and if he make any composition with the insurers after insurance, without orders so to do, he is answerable for the whole insurance.

As fidelity and diligence are expected from the factor, so the law requires the like from the principal; if, therefore, a merchant remits counterfeit jewels to his factor, who sells them as if true; if he receive loss or prejudice by imprisonment or other punishment, the principal shall not only make full satisfaction to the factor, but to the party who bought the jewels.

What is here said of factors, is meant of such as reside abroad to act for merchants, and may be applied to supercargoes, who go a voyage to dispose of a cargoe, and afterwards return with another to their principals: but it is also the custom of the merchants of the highest credit throughout the world, to act mutually in the capacity of factors for each other. The business so executed is called commission-business, and is generally desirable by all merchants, provided they have always effects in their hands, as a security for all the affairs which they transact for the account of others. And this class of traders of established reputation, have current as well as commission account, constantly between them, and draw on, remit to, and send commissions to each other only by the intercourse of letters which, among men of honour, are as obligatory and authoritative as all the bonds and ties of law.

FACTOR, in multiplication, a name given to the multiplier and multiplicand, because they constitute the product. See the article MULTIPLICATION, *&c.*

FACTORAGE, called also commission, is the allowance given to factors by the merchant who employs them. The gain of factorage is certain, however the voyage or sale prove to the merchant: but the commissions vary; at Jamaica, Barbadoes, Virginia, and most of the western parts of the world the commission runs at 8 *per cent.* generally through Italy, $2\frac{1}{2}$; in France, Spain, and Portugal, *&c.* 2; and in Holland, and other places near home, $1\frac{1}{2}$ *per cent.*

FACTORY is a place where a considerable number of factors reside, to negotiate for

for their masters and employers. See the article FACTOR.

The most considerable factories belonging to the British are those established in the East Indies, Portugal, Turky, &c.

FACTUM, in arithmetic, the product of two quantities multiplied by each other.

FACULÆ, in astronomy, certain bright and shining parts, which the modern astronomers have, by means of telescopes, observed upon or about the surface of the sun: they are but very seldom seen. See the article SUN.

FACULTY, in law, a privilege granted to a person, by favour and indulgence, of doing what, by law, he ought not to do.

For granting these privileges, there is a court under the archbishop of Canterbury, called the court of the faculties, the chief officer whereof is styled master of the faculties, who has a power of granting dispensations in divers cases, as to marry without the bans being first published; to eat flesh on days prohibited; to ordain a deacon under age; for a son to succeed his father in his benefice; a clerk to hold two or more livings, &c.

FACULTY, in the schools, a term applied to the different members of an university, divided according to the arts and sciences taught there: thus in most universities there are four faculties, *viz.* 1. Of arts, which include humanity and philosophy. 2. Of theology. 3. Of physic. And, 4. Of civil law. The degrees in the several faculties of our universities are those of batchelor, master, and doctor. See the articles DEGREE, BATCHELOR, &c.

FACULTY *of advocates*, a term applied to the college or society of advocates in Scotland, who plead in all actions before the court of session. They meet in the beginning of every year, and choose the annual officers of the society, *viz.* dean, treasurer, clerks, private and public examinators, and a curator of their library. The manner of admission into the faculty of advocates is by a trial in the civil law, and scotch law: the person desiring to be admitted, having, upon petition, obtained a recommendation to the dean of the faculty, he giveth a remit to the private examinators, who are nine in number, and who, after their election, having divided the body of the civil law into nine parts, each taking one, appoint a diet for examination: in this diet there must be at least seven present, each of whom examines the candidate; and the question being afterwards put, Qualified, yea or no? they give their opinion by balloting, upon which the candidate is either admitted by signing his petition, or remitted to his studies. After the private trial, the dean of the faculty assigns the candidate a title of the civil law, for the subject of a thesis, which being distributed among the advocates, the faculty meet on a day appointed, when three at least of fifteen public examinators dispute against the thesis; and afterwards the faculty give their opinions by balloting, as in the private trial. If the candidate is found qualified, the dean assigns him a law for an harangue before the lords, which harangue being made, he is admitted a member of the faculty, upon paying the fees, taking the oaths to the government, and an oath to be faithful in his office.

FACULTY is also used to denote the powers of the human mind, *viz.* understanding, will, memory, and imagination. See the articles UNDERSTANDING, &c.

The doctrine of the use and objects of the mental faculties, says lord Bacon, has two parts well known, *viz.* logic and ethics, the one producing resolutions and the other actions. The imagination, indeed, on both sides performs the office of agent or embassador, and assists alike in the judicial and ministerial capacity. Wolfius, in his Analys. Psycholog. after establishing the existence of the soul, considers it with respect to its faculty of understanding, which he distinguishes into superior and inferior. The inferior comprehends perception, the source of ideas, thought, imagination, the power of feigning, memory, forgetfulness, and recollection. The superior part of the faculty of understanding consists in attention and reflection, in understanding in general, and its three operations in particular, and in the natural dispositions of the understanding. The second general faculty of the soul, is that of desiring an object, considered as a good; from whence results the contrary determination, when it is looked upon as an evil. This faculty he also distinguishes into inferior and superior: the first is nothing else than the sensitive appetite, the desire or aversion we entertain for objects, when we allow ourselves to be guided by the confused ideas of our senses; hence arise the passions: the superior part is the will, considered so far as it is determined by distinct ideas, exempt from all mechanical impressions; and

and the use we make of this power of determining, is liberty.

FÆCES, in chemistry, the gross matter, or sediment, that settles at the bottom after distillation, fermentation, and the like.

The fæces of wine are more generally known by the name lees. See LEES.

FÆCES, in medicine, the excrements voided by stool. See EXCREMENT.

FÆCULA, in pharmacy, a form of medicine, consisting of the fæces of vegetable juices, principally those of roots; the manner of making which may be gathered from the following example, as ordered in the college dispensatory. To make a fæcula of bryony, take the roots of that plant, any quantity; let them be scraped small with a knife, and squeeze out their juice with a press; after standing a few hours, in vessels that are without any motion, there will be a white sediment like starch, and it must be dried in glazed pans, after the watery part is poured off by inclination.

After the same manner is prepared the fæcula of arum, wild radish, orrice, and the like.

FÆCULENT, in general, is applied to things abounding with fæces, or dregs: thus the blood and other humours of the human body, are said to be fæculent, when without that purity which is necessary to health.

FAENZA, a city and bishop's see of Italy, situated in the Pope's territories, about thirty miles east of Bologna: east long. 12° 38′, and north lat. 44° 30′.

FAGARA, in the materia medica, a fruit brought from the East Indies, much resembling the cubeb. This fruit is a berry, the exterior bark whereof is black and dusky, of an acrid aromatic taste: this berry, when ripe, being cut open, exhibits a dark, shining, solid seed, without either taste or smell. It is recommended against frigidities in the liver; it assists concoction, is an astringent and stomachic.

FAGG, in the sea-language, a term given to the end of those strands which do not go through the tops, when a cable or rope is closed.

FAGGOT, in times of popery here, was a badge worn on the sleeve of the upper garment of such persons as had recanted, or abjured what was then termed heresy; being put on after the person had carried a faggot, by way of penance, to some appointed place of solemnity. The leaving off the wear of this badge was sometimes interpreted a sign of apostacy.

FAGGOTS, among military men, persons hired by officers, whose companies are not full, to muster and hide the deficiencies of the company; by which means they cheat the king of so much money.

FAGONA, in anatomy, a conglomerate gland, the same with thymus. See the article THYMUS.

FAGONIA, the CRETIC-TREFOIL, in botany, a genus of the decandria-monogynia class of plants, the corolla of which consists of five cordated patent petals, with long slender ungues inserted in the cup; the fruit is a roundish acuminated capsule composed of ten valves, which form five lobes, and as many compressed cells; the seed is single, and of a roundish figure. See plate XCV. fig. 2.

FAGOTTINO, in music, is a single curtail, a musical instrument something like the bassoon. See the article BASSOON.

FAGOTTO, in music, the double curtail, or in reality a double bassoon, as big again as the former. See the preceding article.

FAGUS, the BEECH, in botany, a genus of the monœcia-polyandria class of plants, having no corolla; the stamina are generally twelve hairy filaments of the length of the cup; the antheræ are oblong; the fruit is a roundish capsule, very large, surrounded with soft prickles, composed of four valves, and containing only one cell; the seeds are two, roundish, acuminated, and three-cornered. This genus comprehends the common chesnut-tree.

FAILLIS, in heraldry, a french term denoting some failure or fraction in an ordinary, as if it were broken, or a splinter taken from it.

FAILURE, a species of bankruptcy, commonly called breaking, or stopping payments. See BANKRUPTCY.

FAILURE *of record*, in law, is where an action is brought against a person, who alledges, in his plea, matter of record in bar of the action, and avers to prove it by the record; to which the plaintiff replies, *Nul tiel record*, *viz.* There is no such record: whereupon the defendant has a day given him by the court to bring it in; and if he fails to do it, he is then said to fail of his record, and the plaintiff shall thereon have judgment.

Where the tenor only of a record, *&c.* is brought in, or is no bar to the plaintiff's action, the party likewise fails of his record; but small variances in a record may

may be amended, and are no failure of record.

FAINT-ACTION, in law, a feigned action, or fuch as, although the words of the writ are true, yet, for certain caufes, the plaintiff has no title to recover thereby.

FAINT-PLEADER, in law, a covinous, falfe, or collufory manner of pleading, to the deceit of a third perfon.

FAINTING. See LIPOTHYMIA.

FAIR, a greater kind of market, granted to a town, by privilege, for the more fpeedy and commodious providing of fuch things as the place ftands in need of. See the article MARKET.

It is incident to a fair, that perfons fhall be free from being arrefted in it for any other debt contracted than what was contracted in the fame; or, at leaft, promifed to be paid there. Thefe fairs are generally kept once or twice a year, and, by ftatute, they fhall not be held longer than they ought, by the lords thereof, on pain of their being feized into the king's hands, &c. Alfo proclamation is to be made, how long they are to continue; and no perfon fhall fell any goods after the time of the fair is ended, on forfeiture of double the value, one fourth to the profecutor, and the reft to the king. There is a toll ufually paid in fairs, on the fale of things, and for ftallage, picage, &c. See the article TOLL.

Fairs abroad are either free, or charged with toll and impofition. The privileges of free fairs confift chiefly, firft, in that all traders, &c. whether natives or foreigners, are allowed to enter the kingdom, and are under the royal protection, exempt from duties, impofitions, tolls, &c. Secondly, that merchants, in going or returning, cannot be molefted or arrefted, or their goods ftopped. They are eftablifhed by letters-patent from the prince. Fairs, particularly free fairs, make a very confiderable article in the commerce of Europe, efpecially that of the Mediterranean, and inland parts of Germany, &c.

The principal Britifh fairs are, 1. Sturbridge-fair, near Cambridge, by far the greateft in Britain, and perhaps in the world. 2. Briftol has two fairs, very near as great as that of Sturbridge. 3. Exeter. 4. Weft Chefter. 5. Edinburgh. 6. Wheyhill; and, 7. Burford-fair, both for fheep. 8. Pancras fair, in Staffordfhire, for faddle-horfes. 9. Bartholomew fair, at London, for lean and welch black cattle. 10. St. Faith's, in Norfolk, for fcotch runts. 11. Yarmouth fifhing fair for herrings, the only fifhing fair in Great Britain. 12. Ipfwich butter-fair. 13. Woodborough-hill, in Dorfetfhire, for weft country manufactures, as kerfeys, druggets, &c. 14. Two cheefe-fairs at Chipping-Norton: with innumerable other fairs, befides weekly markets, for all forts of goods, as well our own as of foreign growth.

Among the principal free fairs in France are thofe of St. Germains, Lyons, Rheims, Charters, Rouen, Bourdeaux, Troyes, Bayonne, Dieppe, &c.

The moft noted fairs in Germany are thofe of Francfort, Leipfic, and Nurenburg, not only on account of the great trade, but the vaft concourfe of princes of the empire, nobility, and people, who come to them from all parts of Germany to partake of the diverfions to be had.

FAIRFIELD, a town of New-England, in the province of Connecticut, about an hundred miles fouth-weft of Bofton: weft long. 72°, and north lat. 41°.

FAIRFORD, a market-town, about nineteen miles fouth-eaft of Glocefter.

FAIRY, in antient traditions and romances, fignifies a fort of deity, or imaginary genius, converfant on earth, and diftinguifhed by a variety of fantaftical, actions, either good or bad.

The fairies are a pecular fpecies of divinities, that have but little relation to any of thofe of the antient Greeks or Romans, unlefs perhaps to the larvæ; though others, with great reafon, will not have them ranked among gods, but fuppofe them an intermediate kind of beings, neither gods, angels, men, or devils. They are of oriental extraction, and feem to have been invented by the Perfians and Arabs, whofe religion and hiftory abound with relations concerning them: thefe have a particular country which they fuppofe the fairies to inhabit, called Fairy-land.

Spencer's Fairy Queen is an epic poem, under the perfons and characters of fairies. In this fort of writing, the poet lofes fight of nature, and entertains the reader's imagination with the characters of fairies, witches, magicians, dæmons, and departed fpirits. It requires an odd turn of thought, and a peculiar caft of fancy, with an imagination naturally fruitful and fuperftitious.

This fort of poetry raifes a pleafing kind of horror in the mind of the reader, and amufes

amuſes his imagination with the ſtrangeneſs and novelty of the perſons who are repreſented in it; but the judicious object to it, as not having probability enough to affect the imagination.

FAIRY-CIRCLE, or RING, a phænomenon pretty frequent in the fields, *&c.* ſuppoſed, by the vulgar, to be traced by the fairies in their dances: there are two kinds of it, one of about ſeven yards in diameter, containing a round bare path, a foot broad, with green graſs in the middle of it. The other is of different bigneſs, encompaſſed with a circumference of graſs, greener and freſher than that in the middle. Meſſ. Jeſſop and Walker, in the Philoſophical Tranſact. aſcribe them to lightening, which is confirmed by their being moſt frequently produced after ſtorms of that kind, as well as by the colour and brittleneſs of the graſs-roots, when firſt obſerved.

Lightening, like all other fires, moves round, and burns more in the extremity than in the middle: the ſecond circle ariſes from the firſt, the graſs burnt up growing very plentifully afterwards. Others maintain that theſe circles are made by ants, which are frequently found in great numbers therein.

FAIT, in law, the ſame with deed. See the article DEED.

FAITH, *fides*, in antiquity, was deified by the Romans, and had a temple in the capitol.

Public faith is repreſented on medals ſometimes with a baſket of fruit in one hand, and ſome ears of corn in the other; and ſometimes holding a turtle-dove. But the moſt uſual ſymbol, is with her two hands joined together.

FAITH, in divinity and philoſophy, the firm belief of certain truths upon the teſtimony of the perſon who reveals them.

The grounds of a rational faith are, 1. That the things revealed be not contrary to, though they may be above natural reaſon. 2. That the revealer be well acquainted with the things he reveals. 3. That he be above all ſuſpicion of deceiving us.

Where theſe criterions are found, no reaſonable perſon will deny his aſſent: thus, we may as well doubt of our own exiſtence, as of the truth of a revelation coming from God, who can neither be deceived himſelf, nor deceive others by propoſing things to be believed, that are contradictory to the faculties he has given us. Whatever propoſitions, therefore, are beyond reaſon, but not contrary to it, are, when revealed, the proper matter of faith.

Confeſſion of FAITH. See CONFESSION.

FAITHFUL, an appellation aſſumed by the mahometans. See MAHOMETANS.

FAKE, among ſailors, ſignifies one round or circle of a cable or hawſer, coiled up out of the way.

FAKENHAM, a market-town of Norfolk, about ſixteen miles north-weſt of Norwich.

FAKIR, in pagan theology, a kind of indian monks, who even outdo the mortifications and ſeverities of the antient chriſtian anachorets. See ANACHORET. Some of them mangle their bodies with ſcourges and knives; others never lie down; and others remain all their lives in one poſture.

There are alſo another kind of fakirs, who do not practiſe ſuch ſeverities: theſe flock together in companies, and go from village to village, propheſying and telling fortunes. It is ſaid that even perſons of fortune, in India, become fakirs, and that there are more than two millions of them.

FALCADE, in the manege, the motion of a horſe when he throws himſelf upon his haunches two or three times, as in very quick corvets; which is done in forming a ſtop and half ſtop. See the article STOP.

FALCATED, ſomething in the form of a ſickle: thus, the moon is ſaid to be falcated when ſhe appears horned. See the articles MOON and PHASES.

FALCINELLUS, a bird ſuppoſed to be of the heron kind, with a long crooked bill, and called by ſome the black heron. See plate XCV. fig. 3.

It is ſomewhat larger than a pigeon, and is of a greeniſh colour, variegated with purple.

FALCO, in ornithology, a genus of birds, of the order of the accipitres, with three toes always before, and only one behind.

This genus comprehends the falcon-kind, properly ſo called, the hawk, gyrfalcon, eagle, buzzard, pygargus, lannar, kite, keſtril, *&c.* See the articles FALCON, HAWK, *&c.*

FALCON, or *Gentle* FALCON, the yellow-legged falcon, with a grey body ſpotted with brown, and with five or ſix broad and black faſciæ or waves on the tail. It is a very beautiful bird, about the ſize of a raven, and though very bold and vora-

cious, is easily made tame and tractable. Mr. Edwards has described two falcons brought from Hudson's bay, both about the bigness of the common crow. One of these is brown on the upper part of the body, and the under part is whitish, variegated with crescent-like spots of a dark colour. The other is of a black, or very dark dusky colour, on the upper part of the body; the ridge of the wing, in the upper part, is white, and the whole under side is of a dirty clay colour, with black spots at the ends of the feathers. See plate XCVI. fig. 1. which represents the first of these.

In the choice of a falcon, take one that has wide nostrils, high and large eyelids, a large black eye, a round head, somewhat full on the top; barb feathers under the clap of the beak, which should be short, thick, and of an azure colour; the breast large, round, and fleshy; and the thighs, legs, and feet large and strong, with the sear of the foot soft and bluish: the pounces should be black, with wings long and crossing the train, which should be short and very pliable.

FALCON, in gunnery, a piece of cannon. See the article CANNON.

FALCONER, one who tames, manages, and looks after falcons, or other hawks. See the next article.

A falconer should be well acquainted with the quality and mettle of his hawks, that he may know which of them to fly early, and which late. Every night, after flying, he should give them casting; one while plumage, sometimes pellets of cotton, and at another time physic, as he finds necessary. He ought also every evening to make the place clean under the perch, that by her casting he may know whether she wants scouring upwards or downwards. Nor must he forget to water his hawk every evening, except such days wherein she has bathed; after which, at night, she should be put into a warm room, having a candle burning by her, where she is to sit unhooded, if she be not ramage, that she may prune and pick herself.

A falconer should always carry mummy, and other medicines, into the field where a hawk frequently meets with accidents. Neither must he forget to take with him any of his hawking implements; and it is necessary he should be skilful in making lures, hoods of all sorts, jesses, bewets, and other furniture. Neither ought he to be without his coping-irons, to cope his hawk's beak when overgrown, and to cut her pounces and talons as there shall be occasion; nor should his cauting-irons be wanting.

FALCONRY, the art of training all manner of hawks, but more especially the larger sort, called falcons, to the exercise of hawking. See HAWKING.

When a falcon is taken, she must be seeled in such a manner, that as the seeling slackens, she may see what provision lies before her; but care ought to be taken, not to seel her too hard. A falcon or hawk newly taken, should have all new furniture, as new jesses of good leather, mailled leashes with buttons at the end, and new bewets. There should also be provided a small round stick, to stroke the hawk; because the oftener this is done, the sooner and better will she be manned. She must also have two good bells, that she may be found when she scattereth. Her hood should be well fashioned, raised and embossed against her eyes, deep, and yet strait enough beneath, that it may fasten about her head without hurting her; and her beak and talons must be a little coped, but not so near as to make them bleed.

If it be a soar-falcon, which hath already passed the seas, she will indeed be harder to reclaim, but will prove the best of falcons. Her food must be good and warm, and given her twice or thrice a day, till she be full gorged: the best for this purpose is pigeons, larks, or other live birds; because she must be broken off by degrees from her accustomed feeding. When she is fed, you must hoop and lure, as you do when you call a hawk, that she may know when you intend to give her meat. On this occasion she must be unhooded gently, and after giving her two or three bits, her hood must be put on again, when she is to get two or three bits more. Care must be taken that she be close seeled, and after three or four days, her diet may be lessened; the falconer setting her every night to perch by him, that he may awaken her often in the night. In this manner he must proceed, till he find her to grow tame and gentle; and when she begins to feed eagerly, he may give her a sheep's heart. He may now begin to unhood her in the day-time, but it must be far from company, first giving her a bit or two, then hooding her gently, and giving her as much more. When she is sharp set, he may now unhood her, and give



Fig. 1. The Spotted FALCON from Hudson's Bay.

Fig. 2. FER de fourchette.

Fig. 3. FERULA.

T. Jefferys sculp.

give her fome meat juft againft his face and eyes, which will make her lefs afraid of the countenances of others. She muft be borne continually on the fift, till fhe is properly manned, caufing her to feed in company, giving her in the morning, about fun rife, the wing of a pullet; and, in the evening, the foot of a hare or coney, cut off above the joint, flead and laid in water, which being fqueezed, is to be given her with the pinion of a hen's wing. For two or three days give her wafhed meat, and then plumage in more or lefs quantity, as fhe is thought to be more or lefs foul within. After this, being hooded again, fhe is to get nothing till fhe has gleamed and caft, when a little hot meat may be given her in company; and, towards evening, fhe may be allowed to plume a hen's wing in company alfo. Cleanfe the feathers of her cafting, if foul and flimy; if fhe be clean within, give her gentle caftings; and when fhe is well reclaimed, manned, and made eager and fharp fet, he may venture to feed her on the lure.

However, three things are to be confidered before the lure be fhewed her. 1. That fhe be bold and familiar in company, and not afraid of dogs and horfes. 2. Sharp fet and hungry, having regard to the hour of morning and evening, when you would lure her. 3. Clean within, and the lure well garnifhed with meat on both fides; and when you intend to give her the length of a leafh, you muft abfcond yourfelf.

She muft alfo be unhooded, and have a bit or two given her on the lure as fhe fits on your fift: afterwards take the lure from her, and hide it that fhe may not fee it; and when fhe is unfeeled, caft the lure fo near her, that fhe may catch it within the length of her leafh, and as foon as fhe has feized it, ufe your voice as falconers do, feeding her upon the lure, on the ground, with the heart and warm thigh of a pullet.

Having fo lured your falcon, give her but little meat in the evening; and let this luring be fo timely, that you may give her plumage, and a juck of a joint next morning on your fift. When fhe has caft and gleamed, give her a little reaching of warm meat. About noon, tie a creance to her leafh; and going into the field, there give her a bit or two upon her lure; then unwind the creance, and draw it after you a good way; and let him who has the bird hold his right hand on the taffel of her hood, ready to unhood her as foon you begin to lure; to which if fhe come well, ftoop roundly upon it, and haftily feize it, let her caft two or three bits thereon. Then unfeizing and taking her off the lure, hood her and give her to the man again; and, going farther off, lure and feed her as before.

In this manner is the falconer to proceed, luring her every day farther and farther off, till fhe is accuftomed to come freely and eagerly to the lure; after which fhe may be lured in company, taking care that nothing affright her. When fhe is ufed to the lure on foot, fhe is to be lured on horfeback; which may be effected the fooner, by caufing horfemen to be about her when fhe is lured on foot.

When fhe is grown familiar to this way, let fomebody on foot hold the hawk, and he on horfeback muft call and caft the lure about his head, the holder taking off the hood by the taffel; and if fhe feize eagerly on the lure without fear of man or horfe, then take off the creance, and lure her at a greater diftance. And if you would have her love dogs as well as the lure, call dogs when you give her her living or plumage. See the article HAWKING.

FALDAGE, an antient privilege referved to lords, of fetting up folds for fheep in any fields within their manors, for the better manurance of the fame; and this, in former times, was ufually done as well with their tenants fheep, as with their own.

FALDFEY, or FALDFEE, a rent or fee paid by fome cuftomary tenants, for liberty to fold their fheep on their own lands.

FALKIRK, a town of Scotland: weft long. 3° 48′, north lat. 56° 20′.

FALL, the defcent of a heavy body towards the center of the earth. See the articles DESCENT, GRAVITY, ACCELERATION, &c.

FALL is alfo the name of a meafure of length ufed in Scotland, and containing fix ells of that country. See the articles MEASURE and ELL.

FALL, in the fea-language, that part of the rope of a tackle, which is hauled upon.

Alfo when a fhip is under fail, and keeps not fo near the wind as fhe fhould do, they fay fhe falls off; or when a fhip is not flufh, but hath rifings of fome parts of her decks more than others, it is called falls.

LET FALL. See the article LET.

FALLACY, a deception, fraud, or falfe appearance.

The epicureans deny that there is any ſuch thing as a fallacy of the ſenſe: for according to them, all our ſenſations and perceptions, both of ſenſe and phantaſy, are true: whence they make ſenſe the primary criterion of truth. See EVIDENCE. The carteſians, on the other hand, maintain, that we ſhould ſuſpect as falſe, or, at moſt, dubious, every thing that preſent themſelves to us by means only of our external ſenſes, becauſe they ſo frequently deceive us. They add, that our ſenſes, as being fallacious, were never given us by nature for the diſcovery of truth, or the contemplation of the principles of things, but only for pointing out to us what things are convenient or hurtful to our bodies. See EXISTENCE.

The peripatetics keep a middle courſe: they ſay, that if a ſenſible object be taken in its common or generical view, the ſenſe cannot be deceived about it; but that if the object be taken under its ſpecific view, the ſenſe may be miſtaken about it, from the want of the diſpoſitions neceſſary to a juſt ſenſation, as a diſorder in the organ, or any thing uncommon in the medium: thus in ſome diſorders of the eye, all objects appear yellow; a ſtick in water appears broken or crooked, *&c.*

FALLACY, or *ſyllogiſtical* FALLACY, in logic, a captious argument, which, on account of its apparent goodneſs and defect, is made uſe of to deceive a reſpondent not well verſed in the art of ſophiſtry. See the article SOPHISM.

Fallacies either ariſe from words or things. The foundation of all fallacy in words, is an ambiguity; but that of fallacy in things, is very numerous.

FALLING-SICKNESS, the ſame with epilepſy. See the article EPILEPSY.

FALLING-STAR, in meteorology. See the article STAR.

FALLOPIAN TUBES, two canals of a tortuous figure, but approaching to a conic form, joined to the fundus of the uterus, one on each ſide.

They are connected cloſely and continuouſly to the uterus, and more laxly to the ovaries by the alæ veſpertilionum, and finally to the oſſa ilei, by the ligamenta lata: their length is different, ſix, ſeven, or eight fingers breadth, and ſometimes more: their thickneſs about the middle is equal to that of one's little finger; their extremities are ſmaller, that next the uterus is very ſmall; it opens into its cavity, and may be inflated by blowing into the uterus: or a ſmall ſtyle may be thruſt up into it: their ſmall extremity is connected to the uterus, the other is free, and fluctuates about the abdomen: this is larger and is fimbriated, or fringed round the edges; and when there is occaſion, this extremity applies itſelf to the ovary, embracing it with theſe muſcular ſegments or fringes.

Their ſubſtance is membranaceous and cavernous: they are compoſed of a double membrane, the exterior one ſeems to be continuous with the peritonæum, and the interior with the interior membrane of the uterus. They are wrinkled on the inner ſurface, and are imbued with a lubricous humour; but they are not cellulous in the human body as in beaſts. They are furniſhed with a great number of veſſels, and have a cavernous ſubſtance between their membranes, by means of which they are rendered rigid in applying their mouths to the ovary. They are alſo moiſtened on their inner ſurface by theſe veſſels.

Their uſe in generation is very great; they become erect in the time of the coitus, from the influx of the blood and ſpirits, and at that time, by a natural motion, they apply their looſe fringed extremities to the ovaries, which are ſurrounded and imbraced by them. In this ſtate they convey to them the prolific matmer of the male ſemen injected into the womb; and after one of the ovula is impregnated, they receive and convey it to the womb. The fallopian tubes are eaſily diſcovered in hens and other birds, and are called oviducts. See a repreſentation of one of them in plate XCVII. fig. 1.

FALLOW, a pale red colour, like that of brick half burnt: ſuch is that of a fallow-deer. See the article DEER.

FALLOW-FIELD, or FALLOW-GROUND, land laid up, or that has lain untilled for a conſiderable time.

FALLOW-FINCH, or FALLOW-SMICH, a bird otherwiſe called oenanthe. See the article OENANTHE.

FALLOWING *of land*, a particular method of improving land.

The great benefit of fallowing, appears by the common practice of landlords, who every where take care to oblige their tenants to a ſtrict obſervance of it once in three years; few lands being able to bear two crops without it.

It appears that none will find a year's fallowing a loſs to them, let their land be what it will; but, more particularly, the advantage of fallowing conſiſts in, firſt,

firſt, its laying of the land in ridges, and its expoſing it to the froſt, wind, ſun and dews, all which ſweeten and mellow the land very much; the often ſtirring of it, and breaking the clots, diſpoſe it for the bearing of good crops. Secondly, it kills the weeds, by turning up the roots to the ſun and air; and kills not only the weeds that grew with the laſt corn, but wild oats, darnel, and other weeds that ſow themſelves, and that as ſoon as they begin to peep out of the ground; ſo that they have no time to ſuck out any of the heart of the land.

The way of ordering fallow-lands is, after the crop is off, to let the land lie all winter, and what graſs and weeds grow on it, to eat off with ſheep in April, or the beginning of May. As ſoon as they have done ſowing of corn, they begin to plow up their fallows. This firſt fallowing in many places, ought to be very ſhallow, well turned, and clapped cloſe together, becauſe the thinner the turf is, the eaſier will it dry through, and kill the weeds, eſpecially if the weather be dry: but, in ſome places, where there is a very cold clay, that will not bear corn well without being expoſed to the heat of the ſun to warm it, they plow their firſt plowing the depth they deſign to go. About June is the time of the ſecond plowing, which they call twy-fallowing; at which plowing, you muſt go your full depth. About the latter end of July, or the beginning of Auguſt, is the time of try-fallowing, or laſt plowing, before they ſow their rye or wheat: but ſome plow up their land oftener.

If the land riſe full of clots, and if it is a binding land, you muſt make it fine by harrowing of it, when rain comes; but then you muſt not let it lie long before you ſtrike, ſiſe, or plow it up into ſmall ridges, eſpecially if it is wet land; and as near as you can, leave no weeds, turfs, or graſs unkilled, or unbroke with your harrows. But if your land will diſſolve well with the froſt, it is beſt to let it lie a little rougher, eſpecially if you deſign to ſow it with barley; for the rougher it lies for a winter-fallowing, the better. If the winter does not diſſolve the clots, which it will not do in binding lands, you muſt wait rain for the fallowing of it. Where the land is but indifferent, and manure is not to be got, fallowing every other year is found a great improvement. In ſome places they take a crop of wheat, and a crop of peaſe, and ſo fallow their land again.

FALMOUTH, a port-town of Cornwall, in England, ſituated in weſt long. 5° 30′, north lat. 50° 15′, on a fine bay of the engliſh channel, the entrance whereof is guarded by two forts.

FALSE, in general, ſomething contrary to truth, or not what it ought to be: thus we ſay a falſe witneſs, falſe action, falſe weights, falſe claim, *&c.* See the articles WITNESS, ACTION, *&c.*

FALSHOOD, in philoſophy, an act of the underſtanding repreſenting a thing otherwiſe than it is as to its accidents.

Crimen falſi, in the civil law, is fraudulent ſubornation or concealment with deſign to darken or hide the truth, and make things appear otherwiſe than they are. The crimen falſi is committed, 1. By words, as when a witneſs ſwears falſely. 2. By writing, as when a man antedates a contract, or the like. 3. By deed, as when he ſells by falſe weights and meaſures.

FALSIFYING, in law, the proving a thing to be falſe.

The falſifying a record, is where a perſon purchaſes land of another, who is afterwards outlawed for felony; in this caſe, he may falſify the record as to the time when the felony is ſuppoſed to have been committed, and alſo as to the point of the offence. But in the caſe where a perſon is found guilty by verdict, ſuch purchaſer ſhall only falſify the time.

To falſify a recovery, may be done by the iſſue in tail, where it is ſuffered by a tenant for life.

FALSO JUDICIO, in law, a writ which lies for falſe judgment given in the county court, court baron, or other court, not of record. See the article FALSE JUDGMENT.

FALSO RETURNO BREVIUM, a writ that lies againſt a ſheriff for falſe returning of writs he had got to execute.

FALSO BORDONE, in muſic, denotes the burden or ground baſs of a ſong when it is not exact to the rules of harmony. It is alſo applied by the Italians to a certain harmony produced by the accompaniments of ſeveral ſixths following one another, which make ſeveral fourths between two higher parts, becauſe the third part is obliged to make tierces with the baſs.

FALX, in anatomy, a proceſs of the dura mater placed between the two hemiſpheres

ſpheres of the brain, and reſembling a reaper's ſickle.

FAMAGOUSTA, a city of aſiatic Turky, ſituated on the eaſt end of the iſland of Cyprus.

FAMES CANINA, an exceſſive appetite. See the article BULIMY.

FAMILIARS *of the inquiſition*, are people that aſſiſt in the apprehending of ſuch perſons as are accuſed, and to carry them to priſon; upon which occaſion, the unhappy perſon is ſurrounded by ſuch a number of theſe officious gentlemen, that there is no poſſibility of eſcaping out of their hands. As a reward of this baſe employ, the familiars are allowed to commit the moſt enormous actions, to debauch, aſſaſſinate, and kill, with impunity. See the article INQUISITION.

FAMILY, *familia*, denotes the perſons that live together in one houſe, under the direction of one head or chief manager. It alſo ſignifies the kindred or lineage of a perſon, and is uſed by old writers for a hide or portion of land ſufficient to maintain one family. See the article HIDE.

FAMILY, in natural hiſtory, a term uſed by authors to expreſs any order of animals, or other natural productions of the ſame claſs. See the articles CLASS and ORDER.

FAMILY *curves*. See CURVE.

FAN, a machine uſed to raiſe wind and cool the air by agitating it. The cuſtom which now prevails of wearing fans, was borrowed from the Eaſt, where they are almoſt indiſpenſably neceſſary for keeping off the ſun and the flies. Fans are made of a thin ſkin or piece of paper, taffaty, or other light ſtuff, cut ſemicircularly, and mounted on ſeveral little ſticks of wood, ivory, tortoiſeſhell, or the like. The paper, *&c.* is uſually painted, and in mounting is plaited in ſuch a manner, as that the plaits may be alternately inward and outward. That this machine was known to the antients, we may infer from what Terence ſays, *cape hoc flabellum, & ventulum huic ſic facito.* It was compoſed of different materials, but the moſt elegant were made of peacocks feathers, or perhaps were ſo painted as to repreſent a peacock's tail.

FAN is alſo an inſtrument uſed in winnowing corn.

Fans for corn pay on importation 1s. $3\frac{40}{100}$d and draw back on exportation, 1s. $1\frac{50}{100}$d. India fans pay for every 100 l. groſs value at the ſale 26 l. 14 s. $2\frac{52\frac{5}{8}}{100}$d. The draw-back on exportation is 25 l. 2 s. $11\frac{51\frac{3}{8}}{100}$d.

FANATICS, wild, enthuſiaſtic, viſionary perſons, who pretend to revelation and inſpiration.

The antients called thoſe fanatici who paſſed their time in temples (fana) and being often ſeized with a kind of enthuſiaſm, as if inſpired by the divinity, ſhewed wild and antic geſtures. Prudentius repreſents them as cutting and ſlaſhing their arms with knives: ſhaking the head was alſo common among the fanatici; for Lampridius informs us, that the emperor Heliogabulus was arrived to that pitch of madneſs, as to ſhake his head with the gaſhed fanatics. Hence the word was applied amongſt us to the anabaptiſts, quakers, *&c.* at their firſt riſe, and is now an epithet given to the modern prophets, muggletonians, *&c.*

FANIONS, in the military art, ſmall flags carried along with the baggage.

FANO, a biſhop's ſea and port-town of Italy, ſituated on the gulph of Venice, in 14° eaſt longitude, and 44° north latitude.

FAPESMO, a form of ſyllogiſm, wherein the major or firſt propoſition is an univerſal affirmative, the minor an univerſal negative, and the concluſion a particular negative.

FAQUIR, or FAKIR. See FAKIR.

FAR, in horſemanſhip, an appellation given to any part of a horſe's right ſide: thus the far foot, far ſhoulder, *&c.* is the ſame with the right foot, right ſhoulder, *&c.*

FARCE, was originally a droll or petty ſhew exhibited by mountebanks and their buffoons in the open ſtreets, to gather the people together. At preſent it is of more dignity: it is removed from the ſtreet to the theatre, and inſtead of being performed by merry-andrews to amuſe the rabble, is acted by comedians, and become the entertainment of a polite audience. Poets have reformed the wildneſs of the primitive farces, and brought them to the taſte and manner of comedy. The difference between the two on our ſtage is, that comedy keeps to nature and probability, and therefore is confined to certain laws preſcribed by antient critics, whereas farce diſallows of all laws, or rather ſets them aſide on occaſion. Its end is purely to make merry, and it ſticks at nothing which may contribute thereto, however wild and extravagant. Hence the dialogue is uſually low, the perſons of inferior rank, the fable or action trivial

vial or ridiculous, and nature and truth every where heightened and exaggerated to afford the more palpable ridicule.

FARCEY, or FARCIN. See FARCIN.

FARCIMINALIS TUNICA, in anatomy, the fame with the allantois. See the article ALLANTOIS.

FARCIN, FARCY, or FASHIONS, in farriery, a creeping ulcer, and the moft loathfome, ftinking, and filthy difeafe that a horfe can be affected with.

It proceeds from corrupt blood engendered in the body by over-heats and colds, and begins firft with hard knots and puftules, which at length over-run the horfe's whole body. Its origin is commonly in a vein, or near fome mafter vein, which feeds and nourifhes the difeafe.

Sometimes it is occafioned by fpur galling, with rufty fpurs, fnaffle-bit, or the bit of another horfe infected with the fame difeafe.

For the cure, firft bleed the horfe well; then take oil of bay and euphorbium mixed together, and anoint the knots with it; or bathe the place with the ftale of an ox or cow, and the herb called lion's foot, all boiled together. Some apply tallow and horfe-dung, burn the knots with a hot iron, or wafh the fore with falt, vinegar, alum, verdigreafe, green copperas, and gun-powder, boiled in chamber-lee. Others again anoint the fores with a falve made of a penny-worth of tar, two penny-worth of white mercury, and two handfuls of pigeons dung.

Water FARCIN, a fwelling under a horfe's belly and chaps, which, being pierced with a hot iron, yields abundance of yellow, grey, and oily water. It proceeds from a horfe's feeding in low watery grounds, or in pits and holes where the grafs grows above water.

The common way of curing this malady, is by letting out the matter of the fwelled parts with a long-iron-rod, heated red hot; wafhing the parts with chamber-lee and falt, mixed with fome powder of bole armenic, and made as hot as may be endured, for three or four times.

FARDING-DEAL, the fourth part of an acre of land. See the article ACRE.

FARE, moft commonly fignifies the money paid for a voyage, or paffage by water; but, in London, it is what perfons pay for being conveyed from one part of the town to another in a coach or chair. See the articles COACH, WATERMEN, &c.

FAREHAM, a market-town of Hampfhire, ten miles eaft of Southampton.

FAREWELL CAPE, the moft foutherly promontory of Greenland, in 50° weft long. and 60° north lat.

FARINA, a latin term fignifying meal, or the flour of corn. See CORN.

FARINA FOECUNDANS, amongft botanifts, the impregnating meal or duft on the apices or antheræ of flowers; which being received into the piftil, uterus, or feed-veffel of plants, fecundates the rudiments of the feeds in the ovary, which otherwife would decay and come to nothing. See the article GENERATION *of plants*.

FARINGTON, a market-town of Berkfhire, 25 miles north-weft of Reading.

FARM, or FERM, fignifies the chief meffuage in a village, or any large meffuage, whereto belongs land, meadow, pafture, wood, common, &c. and which has been ufed to let for term of life or years, under a certain yearly rent payable by the tenant for the fame.

In different parts of the country, a farm is called by different appellations: in Lancafhire, it is termed ferm hold; in Effex, a wike; and in the north, a tack. According to fome, a farm fhould make three rents, or its produce fhould amount to three times the rent, one for the landlord, another for the charge of cultivating, and the third for the farmer and his family to live on.

FARMER, the perfon who occupies or is leffee of a farm, whether for life or years. See the articles FARM and LEASE.

Hufbandman is the proper addition of a farmer, hufbandry being the myftery or art he profeffes.

FARMER, among miners, fignifies the lord of the field, or the perfon who farms the lot and cope of the king.

FARNHAM, a market-town in the county of Surry, ten miles weft of Guilford, remarkable for its large plantations of hops.

FARO, a fea-port town of Portugal, in the province of Algarva: weft long. 9°, north lat. 36° 50′.

FARREATION, or CONFARREATION, in antiquity. See CONFARREATION.

FARRIER, one whofe employment is to fhoe horfes, and cure them when difeafed or lame.

FARRIER'S POUCH, a leather-bag, in which are contained nippers, drivers, fhoes for all fizes of feet, good fharp nails, and all the implements for new fhoeing a horfe that has loft his fhoe upon the road.

A gentleman on a journey ought to have one of thefe pouches well provided, and a groom that knows how to drive nails.

FARRIERY, the art of trimming the feet, and curing diseased horses. See HORSE.

FARS, or FARSISTAN, the antient Persis, being a province of Persia lying northward of the gulph of Persia. Its chief town is Schiras.

FARTHING, the least copper-coin used in Britain, being half of the half-penny. See the article COIN.

FASCES, in roman antiquity, axes bound up together with rods or staves, and carried before the roman magistrates as a badge of their authority and office.

The use of the faces was introduced by the elder Tarquin, as a mark of sovereign authority: in after times they were borne before the consuls, but by turns only, each his day. They had twelve of them carried by so many lictors.

After the consuls, the prætors assumed them, and Censorinus observes they had only two, though Plutarch and Polybius give them six. In the government of the decemviri, it was the practice at first for only two of them to have the fasces. Afterwards, each of them had twelve, in the same manner as the kings.

FASCETS, in the art of making glass, are the irons thrust into the mouths of bottles, in order to convey them into the annealing tower.

FASCIA, in architecture, signifies any flat member having a considerable breadth and but a small projecture, as the band of an architrave, larmier, &c.

Fascias, in brick buildings, are certain juttings out of the bricks over the windows of each story, except the upper one. These are sometimes plain, like those of columns; but sometimes they are moulded, and the moulding is usually a scima reversa at the bottom, above which are two plain courses of bricks, then an astragal, and, lastly a boultine. See the articles ASTRAGAL and BOULTINE.

FASCIA LATA, in anatomy, called also musculus membranosus, is a muscle of the tibia or leg, arising fleshy from the anterior part of the anterior and superior spine of the ileum. Soon after its origin it becomes intirely membranaceous, and closely surrounds the muscles of the thigh; after which it is inserted in the upper part of the tibia, near the head of the fibula, and from thence sends out an aponeurosis almost over the whole tibia.

The fascia lata serves to draw back the thigh, and to elevate both this and the leg; it is therefore, as well as some other of the adjacent muscles, common to both the thigh and the leg.

FASCIÆ, in astronomy, certain parts on jupiter's body resembling belts or swaths. They are more lucid than the rest of that planet, and are terminated by parallel lines, sometimes broader and sometimes narrower. Mr. Huygens observed a fascia in mars much broader than those of jupiter, and possessing the middle part of his disk, but very obscure.

FASCIALIS, in anatomy, a muscle of the leg called also sartorius. See the article SARTORIUS.

FASCICULUS, in medicine, denotes a handful, or according to some, as much as can be taken up between the finger and the thumb.

FASCINATION, a kind of witchcraft or enchantment supposed to operate by the influence either of the eye or tongue.

To the first kind of fascination, Virgil alludes in his third eclogue, *nescio quis teneros oculus mihi fascinat agnos.* To the second, in his seventh eclogue, in these lines.

> *Aut, si ultra placitum laudarit, baccare frontem*
> *Cingite, ne vati noceat mala lingua futuro.*

FASCINES, in fortification, faggots of small wood of about a foot diameter and six feet long, bound in the middle and at both ends. They are used in raising batteries, making chandeleers, in filling up the moat to facilitate the passage to the wall, in binding the ramparts where the earth is bad, and in making parapets of trenches to screen the men.

Fascines are sometimes pitched over, to be thrown upon the enemies works in order to set them on fire. They differ from saucissons, being made of small wood, whereas the saucissons are made of branches of trees. See the article SAUCISSON.

See also fascines supported by a chandeleer in plate XCVII. fig. 2.

FASHION, a term used among artificers in gold and silver, for the trouble, time, and labour employed in a piece of work. It is by the fashion that workmen's wages are regulated.

FASHION-PIECES, in the sea-language, are two compassing pieces of timber, into which is fixed on each side the transom. See the article TRANSOM.

FAST, or FASTING, in general denotes the abstinence from food; but is more parti-

Fig. 1. FALLOPIAN TUBE.

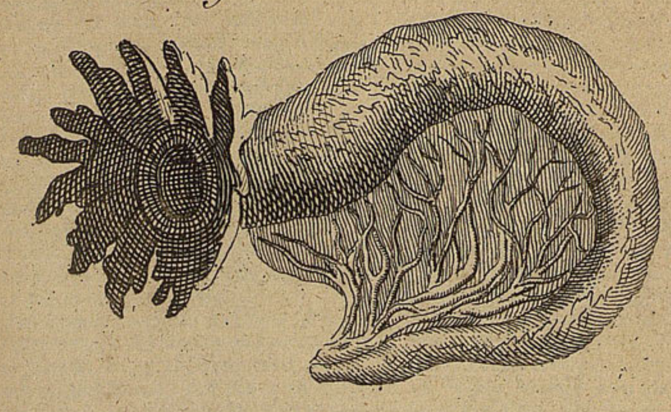
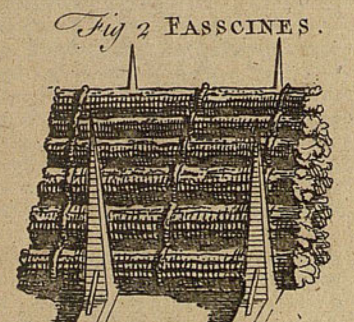


Fig. 2 FASSCINES.



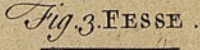


Fig. 3. FESSE.

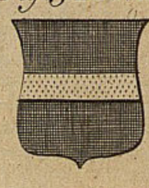


Fig. 4. FIELDFARE.



T. Jefferys sculp.

particularly used for such abstinence on a religious account.

Solemn fasts have been observed in all ages and nations, especially in times of mourning and affliction.

Among the Jews, the calamities for which fasting was enjoined, were a siege, the sword, pestilence, locusts, the caterpillar, diseases, famine, and the like. Upon these days, they wore sack-cloth next the skin, their cloaths were rent, and they wore no shoes: they likewise sprinkled ashes upon their heads, and neither washed their hands, nor anointed their bodies with oil, as usual.

The Greeks and Romans, and, in short, every nation of antiquity, had their stated as well as occasional fasts.

The antient christians had two sorts of solemn fasts, *viz.* weekly and annually; the former being observed every Wednesday and Friday, and the latter during lent. See the articles LENT and STATIONARY DAYS.

The church of England, greek and roman churches, &c. have likewise their stated and occasional fasts. But, by a statute of queen Elizabeth, it is enacted, that whosoever by preaching, teaching, writing, &c. affirms it to be necessary to abstain from flesh, for the saving of the soul of man, or for the service of God, shall be punished as a spreader of false news.

Fasting is likewise enjoined by the mahometan religion, witness their ramadan or lent; and even the pagans of India have several remarkable fasts. See the article RAMADAN.

FAST-DAYS, those appointed, by public authority, to be observed in fasting and humiliation.

FAST-GROUND, or FAST-COUNTRY, among miners, denotes the same with shelf. See the article SHELF.

FASTERMANS, among our saxon ancestors, were pledges or bondsmen, who were answerable for each others good behaviour.

FASTI, in roman antiquity, the calendar wherein were expressed the several days of the year, with their feasts, games, and other ceremonies.

There were two sorts of fasti, the greater and less; the former being distinguished by the appellation *fasti magistrales*, and the latter by that of *fasti calendares*.

The greater fasti contained the feasts, with every thing relating to religion and the magistrates.

The lesser were again distinguished into the city and country fasti, each adapted to the people for whom they were designed. In all these fasti, the court-days, or those whereon causes might be heard and determined, were marked with the letter F; these days were called fasti, from *fari*, to speak or pronounce; and the other days, not marked with this letter, were called nefasti.

FASTI CONSULARES, was also a tablet or chronicle, wherein the several years were denoted by the respective consuls, with the principal events that happened during their consulship. And hence, the term fasti is still applied to the archives and public registers of a nation.

FAT, in anatomy, an oleaginous or butyraceous matter, secreted from the blood, and filling up the cavity of the adipose cells. Fat, properly and distinctly so called, is not secreted from glandules, but from the little arteries of the adipose membrane. Authors distinguish it into two kinds, which they express by the words sevum or adeps, and pinguedo. According to this distinction, there is no such thing as sevum or hard fat in the human body, its fat being all of that sort expressed by pinguedo, or soft and oily. That this oleaginous matter has a circulatory motion, or an egress into the veins, is very evident from the sudden consumption of it in many diseases, and from its vast diminution by exercise, or labour.

The uses of fat are, 1. To serve as a kind of covering to the body, in order to defend it from cold and other injuries. 2. To defend the more tender and sensible parts from being too strongly vellicated by the salts. 3. To preserve in good order the flexion of the muscles, of the cutis, and of the other parts between and about which it is placed. 4. To facilitate the motions of some parts, as the eyes, jaws, &c. 5. To fill up a number of empty interstitial spaces, and by that means to add greatly to the symmetry and beauty of the parts; as is evidently the case in the face, the neck, &c. and to facilitate the distention of the parts, the spaces between which it thus fills up. There is evidently a great use of the fat about the vagina, the anus, the ossa ischii, and pudenda; which filling up many large spaces there, gives way greatly in the distension of those parts in the exclusion of the fœtus, and even of the harder excrements. 6. To prevent the painful

preſſure and attrition of the parts, particularly in the ſoles of the feet, the nates, and other the like parts; in all which the fat is copiouſly diſpoſed, and ſerves in the place of a cuſhion for the muſcular fleſh to reſt upon. 7. And, finally, there is great reaſon to ſuppoſe, that when the body does not receive nouriſhment in the uſual way, the regreſs of the fat into the veins ſupplies that defect.

The fat of ſeveral animals, as a gooſe, dog, viper, bear, and even that of mankind, are met with preſcribed in the intention of ſuppuratives and digeſtives; for being of a penetrating nature, they are ſuppoſed to diſſolve and rarify the incloſed humours, and bring them to what is called maturity. See the articles SUPPURATIVES and RIPENERS.

The beſt way of preparing fat for medicinal uſe, is to free it from ſkins, veins, fibres, *&c.* and after waſhing it till it becomes unbloody, to melt, ſtrain, and preſerve it from air.

FAT, in the ſea-language, ſignifies the ſame with broad. Thus a ſhip is ſaid to have a fat quarter, if the truſſing in or tuck of her quarter be deep.

FAT is alſo uſed for ſeveral utenſils, as 1. A great wooden veſſel, uſed for the meaſuring of malt, and containing a quarter or eight buſhels. 2. A large brewing-veſſel, uſed by brewers to run their wort in. 3. A leaden pan or veſſel for the making of ſalt at Droitwich.

FAT likewiſe denotes an uncertain meaſure of capacity. Thus a fat of iſinglaſs contains from 3 ½ hundred weight to 4 hundred weight; a fat of unbound books, half a maund or four bales; of wire, from 20 to 25 hundred weight; and of yarn, from 220 to 221 bundles.

FATE, *fatum*, denotes an inevitable neceſſity depending upon a ſuperior cauſe. The Greeks called it εἱμαρμένη, as it were a chain or neceſſary ſeries of things indiſſolubly linked together. It is alſo uſed to expreſs a certain unavoidable deſignation of things, by which all agents, both neceſſary and voluntary, are ſwayed and directed to their ends. See the article NECESSITY.

In this laſt ſenſe, fate is diſtinguiſhed into, 1. Aſtrological, ariſing from the influence and poſition of the heavenly bodies, which (it is ſuppoſed) give laws both to the elements and mixed bodies, and to the wills of men. 2. Stoical fate, defined by Cicero an order or ſeries of cauſes, wherein cauſe being linked to cauſe, each produces another, and thus all things flow from one prime cauſe. To this fate, the ſtoics ſubject even the gods.

Fate is divided by later authors into phyſical and divine.

Phyſical fate, is an order and ſeries of natural cauſes appropriated to their effects. By this fate it is that fire warms, bodies communicate motion to each other, *&c.* and the effects of it are all the events and phænomena of nature. See NATURE.

Divine fate, is what is more uſually called providence. See PROVIDENCE.

FATES, *parcæ*, in mythology. See the article PARCÆ.

FATHER, *pater*, a term of relation denoting a perſon who hath begot a child.

By the laws of Romulus, a father had an unlimited power over his children. Amongſt the Lacedæmonians, as we learn in Ariſtotle's politics, the father of three children was excuſed from the duty of mounting guard for the ſecurity of the city; and a father of four children, was exempted from every public burden. The poppæan law amongſt the Romans, granted many noble privileges to the fathers of three children, amongſt which one was, that he ſhould be excuſed from civil offices, and that the mother ſhould have liberty, in her father's life-time, to make a will, and manage her eſtate without the authority of tutors.

Natural FATHER, is he who has illegitimate children.

FATHER IN LAW, a perſon who has married a woman, who has children by a former marriage.

FATHER, in theology, is uſed in ſpeaking of the firſt perſon of the trinity. See the article TRINITY.

FATHER is alſo uſed in ſpeaking of ſpiritual and moral things. Thus, Abraham is called the father of the faithful.

FATHER in church-hiſtory, is applied to antient authors who have preſerved in their writings the tradition of the church. Thus St. Chryſoſtom, S. Baſil, *&c.* are called Greek fathers, and St. Auguſtine and St. Ambroſe latin fathers. No author who wrote later than the twelfth century is dignified with the title of Father.

FATHER is alſo a title of honour given to prelates and dignitaries of the church, to the ſuperiors of convents, to congregations of eccleſiaſtics, and to perſons venerable for their age or quality. Thus we ſay the right reverend father in God, the

the father general of the benedictines, the fathers of the council of Nice, father of his country, &c.

FATHER-LASHER, a name given by the people of Cornwall to a fish of the cottus-kind, with the upper jaw longest, and a prickly head. See COTTUS.

FATHOM, a long measure containing six feet, chiefly used at sea for measuring the length of cables and cordage.

FATNESS. See the article CORPULENCY.

FATUUS IGNIS, in physiology, a meteor, otherwise called will with a wisp. See the article WILL.

FAVIFORM, in general, something resembling a honey-comb. Surgeons, give this appellation to certain ulcers, which emit a sanies thro' little holes, especially in the head.

FAVISSÆ, in antiquity were according to Festus and Gellius, cisterns to keep water in: but the favissæ in the capitol at Rome were dry cisterns, or subterraneous cellars, where they laid up the old statues, broken vessels, and other things used in the temple. These were much the same with what in some of the modern churches are called the archives and treasury.

FAUNALIA, in roman antiquity, three annual festivals in honour of the God Faunus, the first of which was observed on the ides of February; the second on the 16th of the calends of March; and the third on the nones of December. The principal sacrifices on this occasion were lambs and kids. Faunus was a deity of the Romans only, being wholly unknown to the Greeks. Virgil makes him a God of oracles and predictions. Horace calls him the guardian and protector of men and wit, and recommends to him the care of his estate. Ovid represents this deity with horns on his head, and crowned with the pine-tree. It is supposed the roman Faunus was the same with the greek Pan.

FAUNS, *fauni*, a kind of rural deities, among the antient Romans, represented with horns on their heads, sharp pointed ears, and the rest of their bodies like goats; they were the sons of Faunus. See the preceding article.

The Fauni, when they met any person, would terrify and stupify him with their very looks; and were the frequent cause of miscarriages to big-bellied women; they were thought to inhabit the woods together with the nymphs and satyrs.

FAVORITO, in music, as *choro favorito*, a chorus, in which are employed the best voices and instruments, to sing the recitatives, play the ritornella's, &c. this is otherwise called the little chorus, or choro recitante.

FAUSSE-BRAYE, in fortification, a small rampart without the true one, about three or four fathom wide, and bordered with a parapet and banquette.

The design of a fausse-braye is to defend the fosse: it is not reckoned so useful, where there is a dry moat, because the besieged may make better works for the defence of it than a fausse-braye, such as traverses, scillons and coffers; but in places surrounded with a wet ditch, a fausse-braye is more useful, provided it be made only before the curtain and flanks; for lying low, it cannot be easily hurt by the enemies cannon, and it defends the fosse better, because of its low situation, than the true rampart, which on account of its height cannot so well discover the fosse: fausse-brayes ought never to be made before the faces, especially in places faced with brick, or stone, because the breach being generally made in the face, the ruins and rubbish of the rampart are stopped in the fausse-braye, which facilitates the ascent of the breach, and in places lined with brick or stone, the pieces of stone or brick fly among the soldiers that are in the fausse-braye. See the article FORTIFICATION.

FAWN, among sportsmen, a buck, or doe, of the first year; or the young one of the buck's breed in its first year.

FAYAL, one of the Azores-islands. See the article AZORES.

FE, or *St.* FE, the capital of New Mexico: west long. 109°, north lat. 36°.

St. FE *de bagota*, the capital of the kingdom of New Granada: west long. 73°, north lat. 4°.

It is an archbishopric and the seat of the governor of the province, &c.

St. FE is also a town of Spain, in the province of Granada, situated on the river Xemil: west long. 3° 45′, north lat. 37° 20′.

St. FE is also the capital of a province of the same name of Terra Firma in South America, situated on the river of St. Martha, 200 miles south of Carthagena: west. long. 77°, north lat. 7° 25′.

FEALTY, in law, an oath taken on the admittance of any tenant, to be true to the lord of whom he holds his land: by this oath the tenant holds in the freest manner,

manner, on account, that all who have fee, hold *per fidem & fiduciam*, that is, by fealty at the least.

This fealty, at the first creation of it, bound the tenant to fidelity, the breach of which was the loss of his fee. It has been divided into general and special: general, that which is to be performed by every subject to his prince; and special, required only of such as, in respect of their fee, are tied by oath to their lords. To all manner of tenures, except tenancy at will, and frank-almoign, fealty is incident, though it chiefly belongs to copyhold estates, held in fee and for life. The form of this oath by stat. 17 Ed. II. is to run as follows. "I *A. B.* will be to you my lord *D.* true "and faithful, and bear to you faith "for the lands and tenements which I "hold of you, and I will truly do and "perform the customs and services that "I ought to do to you. So help me "God."

FEAST, or FESTIVAL, in a religious sense, is a day of feasting and thanksgiving.

Among the antients, feasts were instituted upon various accounts, but especially in memory of some favourable interposition of providence. Thus, the Jews had their feasts of passover, pentecost, and tabernacles; the Greeks, their cerealia, panathenæa, *&c.* and the Romans, their saturnalia, ambarvalia, *&c.* See PASSOVER, CEREALIA, *&c.*

In the antient Christian church, besides the high festivals of Christmas, Easter, Pentecost, Annunciation, *&c.* there were others instituted in honour of the apostles and martyrs: all which are retained by the church of England. See the articles CHRISTMAS, EASTER, *&c.*

In the church of Rome, there are double, half-double, and simple feasts almost without number. The name of double feasts is given to such whose service is fuller and more solemn than the rest, which likewise constitutes the difference between the others; the churches being embellished, and the altars adorned, according to the rank which each saint holds in his respective church. All high festivals have an octave, consisting of the feast itself, and the seven following days.

In Italy, certain festivals are celebrated solely by the lovers of that country. When a lover wants to give his mistress the highest testimony of his gallantry, he immediately makes her the idol of his devotion; procuring vespers, and even masses, to be said in her honour. For this purpose he makes choice of the festival of some saint whose name she bears; and though the saint has the same name, they manage matters so, that the devotion of the festival is plainly relative to the lover's mistress.

The four quarterly feasts, or stated times, whereon rent on leases is usually reserved to be paid, are Lady-day, or the annunciation of the blessed virgin Mary, or 25th of March; the nativity of St. John the Baptist, held on the 24th of June; the feast of St. Michael the arch-angel, on the 29th of September; and Christmas, or rather of St. Thomas the apostle, on the 21st of December. See the article ANNUNCIATION, *&c.*

FEATHER, in physiology, a general name for the covering of birds; it being common to all the animals of this class to have their whole body, or at least the greatest part of it, covered with feathers or plumage.

There are two sorts of feathers found on birds, *viz.* the strong and hard kind, called quills, found in the wings and tail; and the other plumage, or soft feathers, serving for the defence and ornament of the whole body. All birds, so far as yet known, moult the feathers of their whole body yearly.

Feathers make a considerable article of commerce, as serving for beds, writing-pens, *&c.* Those for beds pay, on importation, 1l. 3s. $1\frac{20}{100}$d; and draw back 1l. 0s. 3d. Ostrich-feathers, if dressed, pay 7s. $8\frac{40}{100}$d. the pound, but if undressed only 3s. $10\frac{20}{100}$d; drawing back in the former case 6s. 9d. and in the latter, 3s. $4\frac{1}{2}$d.

FEATHER-BED. See the article BED.

Feather-beds, whether old or new, pay, on importation, each 10s. $3\frac{20}{100}$d. and draw back 9s. on exporting them.

FEATHER, in the manage, a sort of natural frizling of the hair, which in some parts rises above the rest, resembling the tip of an ear of corn. This happens most frequently, between the eyes; and if lower, it is a sign of a weak sight.

A feather upon a horse's neck, is called a roman feather; being a row of hair turned back, and forming a mark like a sword-blade near the mane.

Mid-Feather, in the falt-works, the partition in the middle of the furnace, which it divides into two chambers. See the article Salt.

Feather-edged, among carpenters, an appellation given to planks or boards, which have one fide thicker than the other.

Prince's Feather, a plant otherwife called amaranth. See the article Amaranth.

FEAZING in the fea-language, fignifies the ravelling out of any great rope, or cable, at the end.

FEBRIFUGE, in medicine, an appellation given to fuch medicines as mitigate, or remove a fever. Thefe medicines are otherwife termed antifebrilia. Febrifuge is alfo a name for the centaurium minus.

FEBRIS, fever, in medicine. See the article Fever.

FEBRUARY, in chronology, the fecond month of the year, reckoning from January, firft added to the calendar of Romulus by Numa Pompilius.

February derived its name from Februa, a feaft held by the Romans in this month, in behalf of the manes of the deceafed, at which ceremony facrifices were performed, and the laft offices were paid to the fhades of the defunct.

February in a common year, confifts only of twenty eight-days, but in the biffextile year, it has twenty-nine, on account of the intercallary day, added that year. See the article Bissextile.

FECIALES, or Foeciales, a college of priefts inftituted at Rome by Numa, confifting of twenty perfons, felected out of the beft families. Their bufinefs was to be arbitrators of all matters relating to war and peace, and to be the guardians of the public faith. It is probable that they were ranked among the officers of religion, to procure them the more deference and authority, and to render their perfons more facred among the people. If the commonwealth had received any injury from a foreign ftate, they immediately difpatched thefe officers to demand fatisfaction, who, if they could not procure it, were to atteft the gods againft the people and country, and to denounce war: otherwife they confirmed the alliance, or contracted a new one, which they ratified by facrificing a hog.

FECULA, or Fæcula, in pharmacy. See the article Fæcula.

FECULENT, or Fæculent. See the article Fæculent.

FECUNDITY, or Foecundity, the fame with fertility. See Fertility.

FEE, in law, fignifies a certain allowance to phyficians, barrifters, attornies, and other officers, as a reward for their pains and labour.

If a perfon refufe to pay an officer his due fees, the court will grant an attachment againft him, to be committed till the fees are paid; and an attorney may bring an action of the cafe for his fees, againft the client that retained him in his caufe.

Fee alfo denotes a fettled perquifite of public officers, payable by thofe who employ them.

The fees due to the officers of the cuftom-houfe, are exprefly mentioned in a fchedule, or table, which is hung up in public view in the faid office, and in all other places where the faid fees are to be paid or received. And, if any officer fhall offend, by acting contrary to the regulations therein contained, he fhall forfeit his office and place, and be for ever after incapable of any office in the cuftom-houfe.

The other public offices have likewife their fettled fees, for the feveral branches of bufinefs tranfacted in them.

Fee-estate, that held by the benefit of another, and for which fome fervice, rent, or acknowledgment is paid to the chief lord, or fuperior, in whom the mere propriety of the foil always continues.

Fee is generally divided into abfolute and conditional. Abfolute, otherwife termed fee-fimple, is where a perfon is feized of lands or tenements, to him and to his heirs for ever; whereas, fee-tail, or conditional fee, is where a perfon is feized of lands, with a limitation to him and the heirs of his body. A fee-fimple is the largeft eftate a perfon can have, and can be conveyed by no other expreffion but heirs for ever; yet, in a will, which is more favoured than a grant, the intention of the teftator is more confidered than the literal meaning of the words. See the article Tail.

Fee-farm, a kind of tenure without homage, fealty or other fervice, except that mentioned in the feoffment; which is ufually the full rent, or at leaft a fourth part of it.

The nature of this tenure is, that if the rent be behind, and unpaid for two years, then the feoffor and his heirs may have an action for the recovery of the lands.

FEE EXPECTANT. See EXPECTANT.

FEELERS, in natural hiftory, a name ufed by fome for the horns of infects.

FEELING, one of the five external fenfes, by which we obtain the ideas of folid, hard, foft, rough, hot, cold, wet, dry, and other tangible qualities.

This fenfe is the coarfeft, but at the fame time, the fureft of all others: it is befides the moft univerfal. We fee and hear with fmall portions of our body, but we feel with all. Nature has beftowed that general fenfation wherever there are nerves, and they are every where, where there is life. Were it otherwife, the parts divefted of it might be deftroyed without our knowledge. It feems that upon this account nature has provided, that this fenfation fhould not require a particular organization. The ftructure of the nervous papillæ is not abfolutely neceffary to it. The lips of a frefh wound, the periofteum, and the tendons, when uncovered, are extremely fenfible without them. Thefe nervous extremities ferve only to the perfection of feeling, and to diverfify fenfation.

Feeling is the bafis of all other fenfations. All the nervous folids, while animated by their fluids, have this general fenfation; but the papillæ in the fkin, thofe of the fingers in particular, have it in a more exquifite degree, fo perfectly, that they convey fome notice of the figure of the bodies which they touch.

The object of feeling is every body that has confiftency or folidity enough to move the furface of our fkin. It was neceffary to perfect feeling, that the nerves fhould form fmall eminences, becaufe they are more eafily moved by the impreffion of bodies, than an uniform furface. It is, by means of this ftructure, that we are enabled to diftinguifh not only the fize and figure of bodies, their hardnefs and foftnefs, but alfo their heat and cold.

Feeling is fo ufeful a fenfation, that it fupplies the office of the eyes, and in fome fenfe indemnifies us for their lofs.

FEELING *a horfe*, in the manege, is of two forts. 1. To feel a horfe in the hand, is to obferve, that the horfe be under fubjection, by obeying the bit. 2. To feel a horfe upon the haunches, is to obferve, that he plies or bends them.

FEINT, in fencing, a fhew of making a thruft at one part, in order to deceive the enemy, that you may really ftrike him in another.

A fimple feint is a mere motion of the wrift, without ftirring the foot.

FELAPTON, in logic, one of the fix moods of the third figure of fyllogifms, wherein the firft propofition is an univerfal negative, the fecond an univerfal affirmative, and the third a particular negative.

FELIS, in zoology, is ufed by Linnæus, as the name of a large genus of quadrupeds, of the order of the feræ; the characters of which are thefe: the fore-teeth are fmall, obtufe, and equal; the tongue is furnifhed with prickles, all pointing backwards; and the feet are formed for climbing, with claws which may be drawn in or exerted at the creature's pleafure.

To this genus belong the lion, tiger, leopard, cat, cat of the mountain, lynx, and ounce. See LION, TIGER, *&c.*

FELIS VOLANS, the FLYING-CAT, an animal fuppofed to be the fame with the flying fquirrel. See SQUIRREL.

FELIS ZIBETHICUS, the CIVET-CAT. See the article ZIBETHICUM ANIMAL.

FELKIRK, a town of Auftria, in Germany, thirty-five miles fouth-eaft of Conftance.

FELLOWS, in fortification, are fix pieces of wood, each whereof form a piece of an arch of fixty degrees, and joined all together, by dulleges, make an intire circle; which with the addition of a nave, and twelve fpokes, make the wheel of a gun carriage. Their thicknefs ufually is the diameter of the ball of the gun they ferve for, and their breadth fomething more.

FELLOWSHIP, or COMPANY, in arithmetic, is when two or more join their ftocks, and trade together, dividing their gain, or lofs, proportionably.

Fellowfhip is either with or without time. Queftions without time, or in the fingle rule of fellowfhip, as it is frequently called, are wrought by the following proportion.

As the whole ftock to the whole gain or lofs, fo is each man's particular ftock to his particular fhare of gain or lofs.

Example I. A, B, and C make a joint ftock: A puts in 460l. B 510l. and C 480l. they gain 340l. what part of it belongs to each?

In order to the folution of this queftion, find the total of their joint ftock, *viz.*

A's

A's ſtock 460 l. + B's ſtock 510 l. + C's ſtock 480 l. = 1450l. the total ſtock. Then 1. To find A's ſhare of the gain, ſtate as follows: If 1450l. : 340l. : : 460l. which being worked by the rule of three, the anſwer will be 107l. 17s. $2\frac{3}{4}$d. for A's ſhare of the profit.

2. B's ſhare of the gain, by ſtating thus, if 1450l. : 340l. : : 510l. and working by the rule of three, will be found to be 119 l. 11 s. $8\frac{1}{2}$ d.

3. C's ſhare will appear 112l. 11s. $0\frac{3}{4}$d. when worked as before, after having ſtated thus. If 1450l. : 340l. : : 480l.

Ex. II. Suppoſe three partners, A, B, and C make a joint ſtock in this manner: A puts in 24l. B 32l. and C 40l. in all 96l. with which they trade, and gain 12 l. required each man's true ſhare of that gain? The firſt operation for A's part of the gain will ſtand thus,

96l : 12l : : 24l : 3l = A's gain.
96l : 12l : : 32l : 4l = B's gain.
96l : 12l : : 40l : 5l = C's gain.

Proof 3l.+4l.+5l.=12l. the whole gain. That is, if the total of all their particular gains amounts to the whole gain, the work is true; if not, ſome miſtake has been committed.

Fellowship *with time*, uſually called the *Double Rule of Fellowſhip*, becauſe every man's money is to be conſidered with relation to the time of its continuance in the joint ſtock. It is worked thus, multiply each man's ſtock by the reſpective time he puts it in for, and add all the products; the total of which muſt be your firſt number through all the ſtatings: the gain or loſs the ſecond, as before; and each man's particular ſtock, multiplied by its time, the third.

Note, all the particular times (if not ſo given) muſt be reduced into one denomination, *i. e.* all years, all months, all weeks, or all days, *&c.* See Reduction.

Ex. I. A put into company 560l. for eight months, B 279l. for ten months, and C 735l. for ſix months; they gained 1000l. What ſhare of it muſt each have? For the ſolution of this queſtion, proceed as follows. A's ſtock 560l. × 8 its time = 4480, B's ſtock 279l. × 10 its time = 2790, C's ſtock 735l. × 6 its time = 4410. Then 4480 + 2790 + 4410 = 11680. Now 1. To find A's ſhare of the profit, ſtate thus. If 11680l. : 1000l. : : 4480l. which being worked by the rule of three, the anſwer will be 383l. 11s. $2\frac{3}{4}$d. for A's ſhare of the gain.

2. For finding B's ſhare, ſtate thus, if 11680l. : 1000l. : 2790l. and working as before directed, the anſwer will be 238l. 17s. $4\frac{3}{4}$d.

3. To find C's proportion of the gain, ſay, if 11680l. : 1000l : : 4410l. then working it by the rule of three, the true amount of his ſhare will appear to be 377l. 11s. $4\frac{1}{4}$d.

Ex. II. Three merchants, A, B, and C, enter into partnerſhip thus; A puts into the ſtock 65l. for eight months; B puts in 78l. for twelve months; and C puts in 84l. for ſix months. With this joint ſtock they traffic, and gain 166l. 12s. 'Tis required to find each man's ſhare of the gain proportionable to his ſtock and time of employing it.

1. A's ſtock 65l. × 8 months, the time it was employed = 520
2. B's ſtock 78l. × 12 months, the time it was employed = 936
3. C's ſtock 84l. × 6 months, the time it was employed = 504
The ſum of all thoſe products is 1960

Then, as before, the ſeveral proportions will ſtand thus:

1960 : 166,6 : : 520 : 44, 2 = 44l. 4s. for A's ſhare.
1960 : 166,6 : : 936 : 79,56 = 79l. 11s. $2\frac{1}{2}$d. for B's ſhare.
1960 : 166,6 : : 504 : 42,84 = 42l. 16s. $9\frac{1}{2}$d. for C's ſhare.
The whole gain = 166l. 12s.

FELO DE SE, in law, a perſon that deliberately lays violent hands on himſelf, and is the occaſion of his untimely death, whether by hanging, drowning, ſtabbing, ſhooting, or any other way.

It is a ſpecies of felony, of which infants, ideots, lunatics, and perſons diſtracted by a diſeaſe, cannot be guilty, it being the willful and deliberate perpetration of ſelf-murder, that conſtitutes this crime. The goods and chattels, both real and perſonal, of a felo de ſe, are forfeited to the king: however, the jury frequently ſave the forfeiture, by finding their verdict lunacy; to which they are inclined, on a favourable interpretation, that it is impoſſible for a perſon in his ſenſes to do a thing ſo contrary to nature.

FELON, in law, a perſon guilty of felony. See the article Felony.

FELON-WORT, in botany, the fame with the folanum, or deadly nightfhade.

FELONY, in law, a capital crime, next in degree to petit treafon, and committed with an evil intention; fuch are murder, theft, fuicide, fodomy, rape, &c. See the articles MURDER, THEFT, &c.

Felony is either by the common law, the civil law, or by ftatute.

Felony at common law is either againft the life of a perfon, as murder, man-flaughter, felo de fe, and fe defendendo; againft his goods, as larceny, and robbery; againft his habitation, as burglary, arfon, and houfe-breaking; or, laftly, againft public juftice, by breach of prifon, refcue, and efcape, &c.

Piracy, and robbery and murder on the fea, is felony both by the civil-law, and by ftatute. See the articles MURDER, BURGLARY, ROBBERY, &c.

There are ufually reckoned two forts of felony, one lighter, and fuch as for the firft offence may be allowed benefit of clergy; which the other, or greater may not. See the article CLERGY.

Felony is punifhable with lofs of life and of lands not intailed, alfo of goods and chattels. It alfo corrupts blood, unlefs the ftatute, making an offence to be felony, ordains it fhall be otherwife, as fome ftatutes do.

FELT, in commerce, a fort of ftuff, deriving all its confiftence merely from being fulled, or wrought with lees and fize, without either fpinning or weaving.

Felt is made either of wool alone, or of wool and hair. Thofe of french make, $3\frac{1}{2}$ yards long, and $1\frac{1}{2}$ broad, for cloaks, pay each 2 l. 14 s. $1\frac{80}{100}$ d. on importation, and draw back 1 l. 12 s. 3 d. on exporting them again.

FELTRI, a town of Italy, fubject to Venice, thirty-five miles north of Padua.

FELUCCA, in fea-affairs, a little veffel with fix oars, frequent in the Mediterranean, which has this peculiarity, that its helm may be applied either in the head or ftern, as occafion requires.

FEMALE, *fœmina*, a term peculiar to animals, fignifying that fex which conceives and generates its young within itfelf. See SEX and GENERATION.

Females differ in many refpects, befides fex, from males: in moft quadrupeds they are fmaller and weaker; but, in birds of prey, the reverfe of this generally holds. See the article MALE.

FEMALE is alfo applied, figuratively, to things without life, from the refemblance they bear to the females of animals; thus we fay, a female fcrew, female flower, &c. See SCREW, FLOWER, &c.

FEMME COVERT, in law, a married woman. See the article COVERTURE.

FEMME SOLE, an unmarried woman, whofe debts, contracted before marriage, become thofe of her hufband after it.

A femme fole merchant, is where a woman, in London, ufes a trade alone, without her hufband, on which account fhe fhall be charged without him.

FEMININE, or FOEMININE, in grammar, one of the genders of nouns. See the article GENDER.

The feminine gender ferves to intimate that the noun belongs to the female. In latin, the feminine gender is moft commonly diftinguifhed by the article *hæc*, as it is in the greek by the article ἡ. In the french the article *la* commonly denotes this gender; but we have no fuch diftinction by articles in the englifh language.

FEMUR, *os femoris*, in anatomy, the thigh-bone.

This is the longeft and ftrongeft bone in the whole human frame. In its upper extremity is to be obferved a very large head, and in this head a cavity deftined for the ligamentum rotundum, by means of which it is fixed in the acetabulum, and its luxation upwards prevented. To its neck is affixed a robuft annular ligament, which contains the head and neck of the bone as it were in a cafe: it is obfervable, that the progrefs of this neck is not ftraight but oblique, nearly horizontal, and turning fomewhat outward, being the contrivance of nature for keeping the thighs afunder, by which means we tread the firmer; and, by this fituation of the neck of this bone alfo, feveral mufcles have a much more commodious infertion than could otherwife have been poffible. Next, may be remarked the fpongy cavernous ftructure of this extremity of the bone, by reafon of which it is lefs liable to fractures, efpecially in this part: the apertures for the ingrefs of feveral veffels are alfo obfervable; and there are two apophyfes, called trochanters, which ferve for the infertion of the mufcles of the thigh, and which, together with the head, become, before puberty, diftinct epiphyfes. In the lower extremity of the femur we obferve two heads, with a cavity between them, for the articulation with the tibia; alfo a pofterior cavity intended to give fafe paffage to the veffels of the tibia: there is, befides, an interior cavity, for the

the placing of the patella: and laftly, two condyles, or tubercles, placed near the heads, and ferving for a fixed point to the origin of the mufcles, which are to move the foot. In the exterior part of thefe we obferve a peculiar depreffion, and often a fingle fefamoide bone; and fometimes there is alfo found another of thefe in the other tubercle: this ufually, however, happens in old fubjects. The whole extremity of the femur, is feen, quite to the age of puberty, a perfectly diftinct epiphyfis. In the body of the thigh-bone it is remarked that the anterior furface is convex, but the pofterior fomewhat concave: the obliquity of this part of the body is fingular: its fpine is remarkable, as is alfo its great cavity for containing the marrow. The ftrength and firmnefs of this bone are furprifingly great; hence the ufe of the thigh-bone is to fupport and fuftain the weight of the whole body, and its moveable articulation at the head gives way to the eafy motion of the body, while the feet are unmoved.

For fractures and luxations of the femur or the thigh-bone, fee the article THIGH.

FEN, a place overflowed with water, or abounding with bogs, See the articles BOG and DRAINING.

Fens are either made up of a congeries of bogs, or confift of a multitude of pools or lakes with dry fpots of land intermixed, like fo many little iflands.

Several ftatutes have been made for the draining of fens, chiefly in Kent, Cambridgefhire, Bedfordfhire, and Lincolnfhire; and by a late act, 11 Geo. II. commiffioners fhall be appointed for the effectually draining and preferving of the fens in the ifle of Ely, who are authorized to make drains, dams, and proper works thereon; and they may charge the landholders therein with a yearly acre-tax, and in default of payment fell the defaulter's lands.

FENCE, in country-affairs, a hedge, wall, ditch, bank, or other inclofure, made around gardens, woods, corn-fields, *&c.* The chief reafon why woodlands and plantations fo feldom profper, is in a great meafure owing to the neglect of fencing them round, to keep out the cattle. This neglect prevails much in the northern parts of this ifland, though the ufe of fences is certainly more neceffary there than in the fouth, as the lands require more fhelter and warmth. There are feveral ways of fencing lands, but the ufual is that of hedging it with either white or black thorn, crab, holly, alder, or furze, *&c.* See HEDGE. But the beft, and probably the cheapeft, confidering the duration and goodnefs of it, where flat ftones are not to be had, is, in a graffy place, to dig turf, a fpit or near a fpit deep, the breadth of your fpade, and about four or five inches thick: lay thefe turf with the grafs outward, even by a line on one fide, and on the backfide of thefe lay another row of turf, leaving a foot fpace of folid ground on the outfide, to prevent the bank from flipping in, if the ground fhould any way be faulty: on the outfide of which you may make a ditch of what breadth or depth you pleafe; or you may lower the ground on each fide with a fmall flope, two feet deep, by which means you will have no lofs of pafture by the fence, becaufe it will bear grafs on both fides. Then, with the earth that comes out of the ditches or floped places, fill the middle of the bank level with the turf on each fide, and then lay two more rows of turf upon the firft, and then fill it again as before: this do, till your bank be four feet high, or of what height you pleafe, only your foundation muft be always broader the higher you raife it. You muft obferve on each fide to give a fmall flope to the bank, fo as to make the top about three feet wide, upon which plant quick, making on the top a little hollow, to keep as much of the rain to the quick as you can. Be fure to plant the quick about a foot or more in depth, by which means you will have a fence fix feet high, befides the hedge on it, which will, in a very dry time, be always green on both fides, like a green wall, make a pleafant fence, and keep all forts of cattle within their bounds.

In Devonfhire they build two ftone walls, firft fetting two edgeways, and then one between, and as it rifes filling the interval or coffer with earth, to any height and breadth at pleafure. This is the neateft and moft faving fence whatever, where they can be fupplied with abundance of flatty ftones. Upon thefe banks they not only plant quick-fets, but timber trees that thrive exceedingly.

In Cornwal the hufbandmen fecure their woods and lands with high mounds, on which they plant acorns, fo that the roots of their fprouts bind in the leffer mould, and form a double and durable fence.

FENCE-MONTH, the month wherein deer begin to fawn, during which it is unlawful to hunt in the foreft.

It commences fifteen days before mid-

 fummer,

fummer, and ends fifteen days after it. This month, by antient forefters, is called defence-month. There are alfo certain fence-months, or feafons, for fifh as well as wild beafts, as appears by ftat. Weft. 13 Geo. II.

FENCING, the art of making a proper ufe of the fword, as well for attacking an enemy, as for defending one's felf.

Fencing is a genteel exercife, of which no gentleman ought to be ignorant. It is learned by practifing with foils, called in latin *rudes*.

According to Pyrard, fencing is in fo high repute in the Eaft-Indies, that the greateft noblemen and even princes teach it.

Fencing is either fimple or compound.

Simple is that performed nimbly and off hand, on the fame line. In this the principal intention, in refpect to the offenfive part, fhould be to attack the enemy in the moft unguarded part; and in the defenfive, to parry or ward off the enemy's thrufts and blows. See the articles GUARD, PARRYING, &c.

Compound fencing, on the offenfive part, includes all manner of arts to deceive the enemy, by making him leave the part unguarded which we want to attack; fuch are feints, appeals, clafhing and intangling of fwords, half-thrufts, &c. And on the defenfive, to parry and thruft at the fame time.

An appeal is a fimple thruft, made by beating with the right foot in the fame place.

FEND, in the fea-language, imports the fame as defend: thus, fending the boat, is faving it from being dafhed to pieces againft the rocks, fhore, fhip's fides. And hence

FENDERS are pieces of old hawfers, cable-ropes, or billets of wood, hung over the fhip's fides, to keep other fhips from rubbing againft and injuring her.

FENDER-BOLTS, or FEND-BOLTS. See the article BOLT.

FENDUE *en pal*, in heraldry, a crofs clove down in pale, that is, from top to bottom, and the two parts fet at fome diftance from each other.

FENESTRA, in anatomy, a term applied to two openings or foramina within the ear, diftinguifhed by the names of the oval and the round feneftra. The feneftra ovalis leads to the veftibule on which ftands the ftapes. The feneftra rotunda leads to the cochlea, and is clofed by a membrane. See the articles EAR, STAPES, COCHLEA, &c.

FENESTRELLES, a town and fort of Piedmont, fifteen miles from Turin.

FENNEL, *fœniculum*, in botany. See the article FOENICULUM.

There are kept two very different forts of fennel-feeds in the fhops, called the common fennel-feed and the fweet fennel-feed. The common kind is of a fharp, biting, and pungent tafte; whereas the fweet kind is not only larger and more beautiful, but of a pleafant aromatic fweetifh tafte, with nothing of the pungency of the other. Sweet fennel-feed is accounted carminative and attenuant, and confiderably diuretic and fudorific, and recommended as a fpecific in the meafles, fmall-pox, and malignant fevers. It is alfo an ingredient in many of the officinal compofitions, and in the decoctions for clyfters.

Fennel-roots are of the number of the five opening ones of the fhops, and prefcribed in the fame intentions with the feeds. They are likewife faid to be great antinephritics.

FENNEL-FLOWER, a plant known among botanifts by the name of nigella. See the article NIGELLA.

FENNEL-GIANT, a plant alfo called ferula. See the article FERULA.

Hog's FENNEL, the englifh name of the peucedanum. See PEUCEDANUM.

Scorching FENNEL, a name given to the thapfia. See the article THAPSIA.

FENUGREEK, or FOENUGREEK. See the article FOENUGREEK.

FEOD, *feodum*, the fame with fee. See FEE.

FEODAL and FEODATORY. See the articles FEUDAL and FEUDATORY.

FEOFFMENT, in law, is a gift or grant of any manors, meffuages, lands, or tenements to another in fee, that is, to him and his heirs for ever, by delivery of feifin, and poffeffion of the eftate granted.

A deed of feoffment is the moft antient conveyance of lands, and is faid in fome meafure to exceed the conveyance by fine and recovery, becaufe it clears all diffeifins, abatements, intrufions, and other wrongful eftates, which neither a fine, recovery, nor bargain and fale by deed indented and inrolled, does. It alfo bars the feoffer from all collateral benefit, in refpect to conditions, powers of revocation, writs of error, &c. and deftroys contingent ufes. A feoffment however muft not be made of fuch things, whereof livery and feifin may not be made; for

no

no deed of feoffment is good to pafs an eftate, without livery of feifin: fo that if either of the parties die before livery, the feoffment becomes void. Neverthelefs a freehold may be granted without livery, on the ftatute of 27 Hen. VIII. by virtue of which a feoffment to the ufe of the feoffer or feoffee, fupplies the place of livery and feifin.

A deed of feoffment is always applied to fome corporeal and immoveable thing, and ufually confifts of the following parts, *viz.* the names and additions of the parties, the confideration, the granting part, the thing granted, the habendum or claufe explaining for what eftate or ufe it is granted, a covenant that the feoffer is feifed in fee and has good right to grant, that the feoffee fhall quietly enjoy the premifes free from incumbrances; and, laftly, a covenant for making further affurance with a letter or power of attorney to make livery and feifin.

FERÆ, in zoology, an order of quadrupeds, the diftinguifhing characters of which are, that all the animals belonging to it have fix fore teeth in each jaw, and the canine or dog-teeth confiderably long.

Under this order are comprehended feveral large genera, as the urfus, felis, muftela, lutra, canis, phoca, meles, erinaceus, dafypus, talpa, and vefpertilio. See the articles URSUS, FELIS, &c.

FERÆ NATURÆ, in law, fignifies beafts and birds that are wild, as foxes, hares, wild-ducks, &c. in which no perfon can claim any property.

FERABATH, a port town of Perfia, fituated on the fouth coaft of the Cafpian fea: eaft lon. 50°, and north lat. 38°.

FERALIA, in antiquity, a feftival obferved among the Romans, on Feb. 21, or, according to Ovid, on the 17th of that month, in honour of the manes of their deceafed friends and relations. During the ceremony, which confifted in making prefents at their graves, marriages were forbidden, and the temples of the divinities fhut up; becaufe they fancied that during this feftival, the ghofts fuffered no pains in hell, but were permitted to wander about their graves, and feaft upon the meats prepared for them.

FER DE FOURCHETTE, in heraldry, a crofs having at each end a forked iron, like that formerly ufed by foldiers to reft their mufquets on. It differs from the crofs fourcheé, the ends of which turn forked, whereas this has that fort of fork fixed upon the fquare end. See plate XCVI. fig. 2.

FER DE MOULIN, *milrinde*, *inke de moulin*, in heraldry, is a bearing fuppofed to reprefent the iron-ink or ink of a mill, which fuftains the moving mill-ftone.

FERDEN, or VERDEN, a city of Germany, fubject to Hanover; it is fituated in lower Saxony, on the river Aller, twenty-fix miles fouth-eaft of Bremen: eaft lon. 9°, and north lat. 53° 24′.

FERDWIT, a term formerly ufed to denote a freedom from going forth upon any military expedition; or, according to fome, the being quit of manflaughter committed in the army.

FERE, a town of Picardy, in France, forty-two miles fouth-eaft of Amiens.

FERENTARII, in roman antiquity, were auxiliary troops, lightly armed; their weapons being a fword, bow, arrows, and a fling.

There were another kind of ferentarii, who carried arms after the armies, and were ready to fupply the foldiers in time of battle.

FERETINO, a city and bifhop's fee of Italy, about fifty miles eaft of Rome: eaft lon. 14° 5′, and north lat. 41° 45′.

FERIÆ, in roman antiquity, holidays, or days upon which they abftained from work.

It was a pollution of the feriæ, according to Macrobius, if the rex facrorum or flamines faw any work done on them, and therefore they ordered proclamation to be made by the herald, that every one might abftain from work, and whoever tranfgreffed the order, was fined. Nay, the fame author informs us, that Mutius Scævola, the pontiff, was of opinion, that the breaking the feriæ was an unpardonable crime, unlefs it was done inadvertently, and in this cafe an expiation was to be made by facrificing a hog.

The Romans had two kinds of feriæ: 1. The public, common to all the people in general. 2. The private, which were only kept by fome private families.

The public feriæ were four-fold: 1. Stativæ feriæ, holidays which always fell out upon the fame day of the month, and were marked in the calendar; of thefe the chief were the agonalia, carmentalia, and lupercalia. See the articles AGONALIA, CARMENTALIA, &c. 2. Conceptivæ feriæ, holidays appointed every year upon certain or uncertain days by the magiftrates, or the pontiff; fuch were the latinæ, paganalia, compitalia, &c. See the article

article PAGANALIA, &c. 3. Imperativæ feriæ, holidays commanded or appointed by the authority of the confuls or prætors; of this kind we may reckon the lectifternium. See LECTISTERNIUM. 4. Nundinæ, the days for fairs. See NUNDINÆ. The private feriæ were either confined to private families or particular perfons, as birth-days; and thofe expiations upon the tenth day after a perfon died in a houfe, called feriæ denicales.

FERIÆ LATINÆ were inftituted by Tarquinius Superbus, who having overcome the Tufcans, made a league with the Latins, and propofed to them to build a temple in common to Jupiter Latialis, in which both nations might meet, and offer facrifice for their common fafety. At this feftival a white bull was facrificed, and each town, both of the Latins and Romans, provided a certain quantity of meat, wine, and fruits. At firft the folemnity continued but one day; after the expulfion of the kings, the fenate added a third, a fourth, and fo on to ten days.

FERIA, in the romifh breviary, is applied to the feveral days of the week; thus Monday is the feria fecunda, Tuefday the feria tertia; though thefe days are not working days, but holidays. The occafion of this was, that the firft chriftians were ufed to keep the eafter-week holy, calling Sunday the prima feria, &c. whence the term feria was given to the days of every week. But befides thefe, they have extraordinary feriæ, *viz.* the three laft days of paffion-week, the two days following eafter-day, and the fecond feriæ of rogation.

FERIAL DAYS, according to the ftatute 27 Hen. VI. cap. v. are taken for all days of the week except Sunday.

FERMANAGH, a county of Ireland, in the province of Ulfter, the chief town of which is Innifkilling.

FERMENT, any body which being applied to another, produces fermentation. See the article FERMENTATION.

Ferments are either matters already in the act of fermentation, or that foon run into this act. Of the firft kind are the flowers of wine, yeaft, fermenting beer, or fermenting wine, &c. and of the fecond are the new expreffed vegetable juices of fummer-fruits.

Among diftillers, ferments are all thofe bodies, which, when added to the liquor, only correct fome fault therein, and by removing fome obftacle to fermentation, forward it by fecondary means; as alfo fuch as being added in time of fermentation, make the liquor yield a larger proportion of fpirit, and give it a finer flavour. See the article ADDITION.

It appears that ferments are of ufe not only in beginning, but in regulating and determining the fpecies of fermentation: thus frefh yeaft determines the fermentation of wheat flour, to make our common bread, which would prove of another kind with the flowers or lees of vinegar; and thus fpecific or determinate ferments have their correfpondent effects. If fugar, honey, manna, treacle, or new wine be added to vinegar, themfelves are foon changed into vinegar without ftopping to make wine; becaufe the acetous ferment or vinegar over-rules them; and fo vinegar is fooneft made in a cafk that has before contained the fame liquor. And if the beft wine were put into a cafk that had held putrified vinegar, the wine would not now make vinegar, but immediately run into corruption. So great and over-ruling a power have fpecific ferments; the ufe of which may afford confiderable rules in chemiftry, practical philofophy, and arts.

We recommend, therefore, to diftillers to be careful in pitching upon a proper ferment, and alfo to confider its quantity, quality, and manner of operation. The quantity muft be proportioned to that of the liquor, to its tenacity, and the degree of flavour it is intended to give, and to the difpatch required in the operation. As to the quality, it muft be chofen perfectly fweet and frefh, for all ferments are liable to grow mufty and corrupt; and if in this ftate they are mixed with the fermentable liquor, they will communicate their naufeous and filthy flavour to the fpirit, which will fcarce ever be got off by any fubfequent refining. If the ferment be four, it muft by no means be ufed to any liquor; for it will give it an acetous inftead of a vinous tendency. The ferment is to be put to the fermentable liquor in a ftate barely tepid, or fcarce lukewarm. For the ferments moft generally ufed, fee the articles LEES *of wine*, YEST, &c.

FERMENTARIANS, *fermentarii*, an appellation which thofe of the latin church have given to the Greeks, on account of their ufing leavened or fermented bread in the eucharift. The greek church, on the other hand, call the Latins azymites. See the article AZYMITES.

FERMENTATION, may be defined a fenfible

ſenſible internal motion of the conſtituent particles of a moiſt, fluid, mixt or compound body; by the continuance of which motion, theſe particles are gradually removed from their former ſituation or combination, and again, after ſome viſible ſeparation is made, joined together in a different order and arrangement. The whole proceſs then of fermentation, conſiſts of two different operations, *viz.* an analytical one, whereby the particles are reſolved; and a ſynthetical one, whereby they are new ranged. And whenever theſe two different effects are found to be produced in direct ſequence, the operation may be called by the name of fermentation, whether it happen in the blood or other animal, vegetable, or mineral ſubſtances. All ſeparable, mixt, or compound bodies, may be the ſubject of this operation; but the eaſier they are ſeparable by means of water, air, and heat, the more readily they ferment. Thus the ſweet or ſaccharine part of malt more readily diſſolving in warm water, ferments eaſier than unmalted corn, which is more clammy, and will not diſſolve ſo ſoon.

Fermentation, according to our later philoſophers, ariſes from an inequality in the attractions of coheſion of the conſtituent particles of bodies. They diſtinguiſh it into two kinds, the one is that which happens when a ſolid is diſſolved by a fluid; the other is, when two fluids being mixed together, ferment with each other. Dr. Friend and Keill are of opinion, that in order to cauſe a fermentation between a ſolid and a fluid, it is neceſſary, 1. That the particles of the ſolid attract thoſe of the fluid with a greater force, than the particles of the fluid attract one another. 2. That the pores of the ſolid be not too ſmall to admit the particles of the fluid into them. 3. That the body be of ſo looſe a contexture, that the force of impact, with which the particles of the fluid ruſh into its pores, may be ſufficient to diſunite its parts. 4. That the elaſticity of the particles tend to promote and augment the fermentation. Dr. Boerhaave makes alſo four conditions requiſite, 1. That there be a due proportion between the ſize of the particles of the fluid, and the pores of the body to be diſſolved. 2. That the figure of the particles of the fluid, have a determinate relation to that of the pores of the ſolid. 3. That the particles of the fluid be ſufficiently ſolid, that their momentum or force of action may not be too weak. 4. That there be a fit diſpoſition of the particles of the fluid, when received into the pores of the ſolid, to make ſome ſtay there and not immediately to paſs through, but to act every way upon the ſolid, as they move towards the external ſurface thereof. Mr. Rowning thinks there is no occaſion to have recourſe to ſo many ſuppoſitions: if the particles of the ſolid (ſays he) attract thoſe of the fluid with a greater degree of force than either thoſe of the fluid or thoſe of the ſolid attract one another, it is ſufficient, and there will follow a diſſolution of the body, as may clearly be demonſtrated from the laws of mechanics, whatever the other circumſtances relating to the figure or magnitude of pores, *&c.* may be. See Rown. Syſt. of Nat. Phil. part II. Diſſ. VIII.

Fermentation is divided by chemiſts into many diſtinct ſpecies, particularly into vegetable, animal, and mineral. The vegetable kind again may be diſtinguiſhed into vinous, acetous, and putrefactive; the vinous again into mucilaginous, mouldy, and putrefactive, and ſo of the acetous.

Of vinous FERMENTATION. The juice of the grape being chemically examined, proves to be no more than a large proportion of real ſugar diſſolved in water, with the addition only of a certain flavour in the juice of the grape, according to the nature of the vine; whence we may lay it down as an axiom, that a ſaccharine ſubſtance is the baſis of wines; and indeed whoever would thoroughly enquire into the nature and means of improving vinous and acetous fermentation, cannot perhaps do better than to chooſe ſugar for his ſubject; a chemical analyſis of which will ſhew the principles neceſſarily required in this operation. Theſe principles appear to be an acid ſalt, an oil and earth ſo united together, as to be capable of diſſolving perfectly in water. Experience ſhews us, that all fermentable bodies do not require ferments to begin their motion of fermentation. Raiſins we know, require none, much leſs does the freſh expreſſed juice of the grape, or other vegetable juices in the ſummer ſeaſon, or in a warm air. But all ſweet vegetable juices that have felt much of the fire, as treacle, wort high boiled, rob of malt, rob of elder, or the like, uſually require a conſiderable proportion of vinous ferments to make them work.

work. Water, we find is abfolutely neceffary to begin and procure a fermentative motion in vegetable fubftances; for raifins and fugar being kept dry, will never ferment: and this holds univerfally of all the fubjects of vinous and acetous fermentation. Whence water is an inftrument that muft be neceffarily employed in thefe kinds of fermentation, whether natural or artificial. Warmth, with the free admiffion of the external air, is neceffary to expedite the actions of vinous fermentation; for if raifins and water were to ftand either in a very cold place, or be kept entirely from the accefs of the common atmofpherical air, either no fermentation, or a very flow and fmall one, would enfue, as has been often experienced. The lees remaining at the bottom of a cafk where wine has fermented, will fet any lefs fermentable fubject at work, and determine its fermentation for the vinous kind. Whence it appears that vinous fermentation confifts, firft, in an inteftine ftruggle or commotion of the fluid; and, fecondly, in a feparation of a groffer part, which did not appear in that form before.

Of acetous FERMENTATION. The whole procefs of making vinegar being attentively confidered, it is obfervable, that if wine were not bunged down when arrived at its vinous ftate, but fuffered ftill to remain open and expofed to a warm air, it would fpontaneoufly become vinegar; and the fooner, if a fomewhat greater degree of heat than ferved for the making of wine, were employed. Acetous fermentation then requires a ftronger heat than the vinous; and wines having once finifhed their fermentation, as wines, do not naturally ftop there, but unlefs prevented, proceed directly on to vinegars; where again they make no ftop, but unlefs prevented here alfo, fpontaneoufly go on to vapidity, ropinefs, mouldinefs, and putrefaction: from which obfervation we would deduce this axiom, that, to fpeak philofophically, the intention and tendency of nature is to proceed from the very beginning of vinous fermentation directly in a continued feries to putrefaction, and thence again to a new generation. See PUTREFACTION, *&c.* If we examine the changes wrought upon vegetable fubjects by vinous and acetous fermentation, we fhall find that an inflammable fpirit is produced by the action of vinous fermentation, from a vegetable fubject and water, wherein no figns of any fuch fpirit appeared before; infomuch, that this may be juftly efteemed the criterion or infeparable effect of vinous fermentation; but that acetous fermentation, on the other hand, has a very different effect, and that it either conceals, alters, exhales, deftroys, or fome ways abolifhes the inflammable fpirit produced by the vinous fermentation. A part of this fpirit is unqueftionably exhaled by the heat employed in acetification, yet part alfo remains behind under a different modification, fo as to be recovered by art in an inflammable form, as we find by diftilling the fugar of lead, which is only lead diffolved in fpirit of vinegar. Having thus a criterion of acetous fermentation, as before we had of the vinous, (for if an acid uninflammable liquor comes firft by diftillation over from a vegetable fubject after fermentation, this will determine that fermentation to have been of the acetous kind) we are plainly led to allow of two very different kinds of fermentation in the fame vegetable fubject, and we make no doubt that fome other fpecies may be found upon due enquiry.

It has been difputed, whether animal bodies naturally undergo a fermentation after death; but fuppofing this not a difpute about words, it fhould feem that there is a proper fpecies of fermentation peculiar to the animal fubjects, as there is one peculiar to vegetables: and till this point be fettled, we fhould not lay down vegetable fermentation as the teft and ftandard of fermentation in general. For want of diftinguifhing in this cafe, all true fermentation feems denied to the blood and juices circulating in a living animal body, and, again, to the fap of vegetables. But perhaps, were the enquiry into fermentation profecuted in its full latitude, and not arbitrarily confined to any fingle fpecies, many natural and artificial operations would prove to be actual fermentation. To fay that there is no fermentation in the blood, becaufe it affords no inflammable fpirit upon diftillation, is to fay, in effect, that blood is not wine; whereas the queftion is not whether there be a vegetable fermentation in the blood, but whether there be not an animal one; the criterion of which is the production of a volatile urinous falt, as the production of an inflammable fpirit is the criterion of vinous fermentation. Some of the proceffes in chemiftry feem to prove, that fermentation is not confined

fined to animal and vegetable ſubſtances, but that minerals are alſo liable to ſomething of it. If an ounce of lead, and an ounce of biſmuth be melted together in an iron ladle, and an ounce of quickſilver be heated in another ladle, and all three mixed together, this makes an amalgama, which appears perfectly uniform or homogeneous, and paſſes through leather in a running form. But this mixture being ſuffered to cool and ſtand quiet for ſome hours, a groſs matter will ſeparate from it by degrees, and float upon the reſt, which will now run eaſily through leather, and leave the groſs metallic matter behind. Here then appears all the requiſites of fermentation, a fluid form, an uniform matter, an inteſtine motion, and an actual ſeparation of a groſſer matter, leaving a thinner behind. There are many more inſtances of an apparent fermentation in mineral bodies; but this ſuffices to evince, that in a proper ſenſe, there is an actual fermentation exerciſed not only in the vegetable and animal, but alſo in the mineral kingdom.

Upon the whole we may infer, 1. That the degrees of fermentation differ with the degrees of heat employed: thus vinous fermentation requires a leſs degree of heat than the acetous, the acetous leſs than the putrefactive, which laſt may conſiſt with a degree of ignition. 2. That a particular kind of fermentation may be carried on in the bodies of living animals and vegetables, which are largely ſupplied with the requiſite inſtruments of fermentation, *viz*, water, air, and heat; and in fact both animals and vegetables appear to have an inteſtine motion in all their circulating fluids, which continually depoſite a groſſer matter in the canals and parts they move through. 3. That when vegetables and animals die, there ſoon begins a different kind of fermentation in all their parts, tending not now to the repair, but to the entire deſtruction of their organical veſſels. 4. That dry or ſolid ſubſtances, cannot in that ſtate undergo a proper fermentation; for tho' they may in that ſtate be ſeparated into minute particles, yet they cannot range themſelves together in any order, nor depoſite a groſſer matter without being agitated by ſome fluid, or, for ſome time, ſuſpended therein.

We obſerved before, that heat, with a free admiſſion and emiſſion of the common air, were neceſſary to promote fermentation; the things which check or hinder it, are theſe: 1. The acid fume of burning ſulphur, received in a large quantity at ſeveral times, and ſhut up along with the air, remaining on the top of the fermenting liquor. 2. Alkaline ſalts, if added in a large quantity to fermenting liquors, immediately excite a greater efferveſcence, which preſently ceaſing, all farther fermentation is ſtopped. But, in both theſe caſes, the fermenting liquor is ſpoiled. 3. The ſtopping up of the containing veſſel ſo cloſe, that nothing may eſcape or enter, provided the veſſel be ſo ſtrong as not to burſt by the force of the confined liquor. 4. Too great a degree of cold ſtops all fermentation, which can ſcarce proceed with leſs than thirty-ſix degrees of heat. 5. Too great heat (it ſhould not exceed ninety degrees) rather diſſipates and throws off the active principles of fermentation, than excites and promotes them. 6. The extraction of the elaſtic air by means of the air-pump, and, laſtly, a violent compreſſion of the ſame air with the fermentable matter, entirely prevents the origin, and ſtops the progreſs of fermentation.

FERMENTED, in general, ſomething that has undergone a fermentation. See the preceding article.

Fermented liquors are eſteemed great antidotes to putrefaction; accordingly the abſtinence from them is aſſigned as one cauſe why the Turks are more ſubject than other people to the plague, and other contagious diſtempers. It is likewiſe obſerved, that beer, wine, and ſpirituous liquors coming more into general uſe, has been one great means of ſuppreſſing putrid diſeaſes. See DRINK.

The ſpirituous part, is the life of all fermented liquors; it keeps the whole together, and, in a manner, embalms and renders them durable, and not ſubject to corruption. It alſo, in a great meaſure, gives them that aromatic refreſhing and reſtorative virtue, and the beſt effects they have on the human body.

FERMO, a port-town of Italy, ſituated on the gulph of Venice, about thirty miles ſouth of Ancona. It is an archbiſhop's ſee.

FERN, *filix*, in botany. See FILIX.

Fern is very common in dry and barren places. It is one of the worſt of weeds for lands, and very hard to deſtroy, where it has any thing of a deep ſoil to root in. In ſome grounds, the roots of it are found to the depth of eight feet. One of the moſt

moſt effectual ways to deſtroy it, is often mowing the graſs, and if the field be ploughed up, plentiful dunging thereof is very good: but a moſt certain remedy for it is urine. However, fern, cut while the ſap is in it, and left to rot upon the ground, is a very great improver of land; for if burnt, when ſo cut, its aſhes will yield double the quantity of ſalt that any other vegetable can do.

In ſeveral places in the north, the inhabitants mow it green, and burning it to aſhes, make thoſe aſhes up into balls, with a little water, which they dry in the ſun, and make uſe of them to waſh their linen with; looking upon it to be near as good as ſoap for that purpoſe. It is ſaid, that the frequent treading them down by ſheep, while that ſort of cattle feed upon them, is an infallible method of killing them.

The antients uſed the root of the fern and the whole plant, in decoctions and diet-drinks, in chronic diſorders of all kinds ariſing from the obſtructions of the viſcera, particularly in hypochondriac caſes, and in obſtructions of the ſpleen and pancreas. There are not wanting modern authors who give it as high a character in theſe caſes as the antients have done, but it is an ill taſted medicine, and in no great uſe in the ſhops. The country people eſteem it as a ſovereign remedy for that troubleſome diſtemper the rickets in children, and they give it alſo as a powder, after drying it in an oven, to deſtroy worms.

FERNANDO, or Fernandes, an iſland in the Pacific ocean: weſt long. 83°, ſouth lat 33°.

FERRARA, a city and archbiſhop's ſee of Italy: eaſt long. 12° 6′, north lat. 44° 50′.

FERRE, or *le* Ferre, a city of Picardy, in France, forty miles ſouth-eaſt of Amiens: eaſt longitude 3° 26′, north latitude 49° 45′.

FERRET, *viverra*, in zoology, a quadruped of the muſtela kind. See the article Mustela.

The head is ſmall and depreſſed; the ſnout ſharp; the eyes look very fierce and red; the ears are ſhort, patulous, and erect, they are conſiderably wide, eſpecially towards the baſe; the mouth is large, and the teeth very ſharp; the neck is ſhort; the body is long and thin; the legs are ſhort, and each divided at the foot into five toes, and there armed with ſharp claws.

This animal is very frequent with us, but is a native of America. Our people uſe it in taking of rabbits; they plant nets at the mouth of the borrows, and turn in the ferret, after having muzzled him that he may not bite the rabbits, which are freightened by him out of their holes into the nets that are laid for them.

Ferrets, among glaſs-makers, the iron with which the workmen try the melted metal, to ſee if it be fit to work.

It is alſo uſed for thoſe irons which make the rings at the mouth of bottles.

FERRETTO, in glaſs-making, a ſubſtance which ſerves to colour glaſs.

This is made by a ſimple calcination of copper, but it ſerves for ſeveral colours: there are two ways of making it, the firſt is this. Take thin plates of copper, and lay them on a layer of powdered brimſtone, in the bottom of a crucible; over theſe lay more brimſtone, and over that another lay of the plates, and ſo on alternately till the pot is full. Cover the pot, lute it well, place it in a wind furnace, and make a ſtrong fire about it for two hours. When it is taken out and cooled, the copper will be found ſo calcined, that it may be crumbled to pieces between the fingers, like a friable earth. It will be of a reddiſh, and, in ſome parts, of a blackiſh colour. This muſt be powdered and ſifted fine for uſe.

FERRO, weſt long. 19°, north lat. 28°, the moſt weſterly of the Canary iſlands, near the african coaſt, where the firſt meridian was lately fixed in moſt maps, but now, the geographers of almoſt every kingdom make their reſpective capitals the firſt meridian, as we do London.

Ferro, ſome little iſlands ſituated in the northern ocean, 200 miles north-weſt of the Orcades, and as many ſouth-eaſt of Iceland: weſt long. 7°, north lat. 63°.

FERROL, a ſea-port-town of Spain, in the principality of Galicia, ſituated on a bay of the Atlantic ocean, twenty miles north-eaſt of the Groyne, and fifty miles north of Compoſtella, a good harbour, where the ſpaniſh ſquadrons frequently ſecured themſelves in the late wars: weſt longitude 8° 40′, north latitude 43° 30′.

FERRUGINOUS, any thing partaking of iron, or that contains particles of that metal.

It is particularly applied to certain mineral ſprings, whoſe waters are impregnated with the particles of iron, generally

rally termed chalybeats. See the article CHALYBEAT.

FERRY, a liberty by prefcription, or the king's grant, to have a boat for paffage, on a firth or river, for carrying paffengers, horfes, &c. over the fame for a reafonable toll.

A ferry is in the nature of a common highway; and the not keeping it up has been held to be indictable.

FERTILITY, that quality which denominates a thing fruitful or prolific.

Nothing can produce fertility in either fex, but what promotes perfect health: nothing but good blood, fpirits, and perfect animal functions, that is, high health, can beget perfect fecundity; and therefore, all means and medicines, all noftrums and fpecifics to procure fertility, different from thofe which procure good blood and fpirits, are errant quackery. Dr. Cheyne fays, that water-drinking males are very rarely infertile; and that if any thing in nature can prevent infertility and bring fine children, it is a milk and feed-diet perfevered in by both parents.

To increafe the fertility of vegetables, fays lord Bacon, we muft not only increafe the vigour of the earth and of the plant, but alfo preferve what would otherwife be loft: whence he infers, that there is much faved by fetting, in comparifon of fowing. It is reported, continues he, that if nitre be mixed with water to the thicknefs of honey, and after a vine is cut, the bud be anointed therewith, it will fprout within eight days. If the experiment be true, the caufe may be in the opening of the bud, and contiguous parts, by the fpirit of the nitre; for nitre is the life of vegetables.

How far this may be true, is not perhaps fufficiently fhewn, notwithftanding the experiments of Sir Kenelm Digby and M. Homberg. Confult Mr. Evelyn's Sylva, the Philofophical Tranfactions, the french Memoirs, and Dr. Stahl's Philofophical Principles of Chemiftry: but a proper fet of accurate experiments feems ftill wanting in this view.

FERULA, FENNEL-GIANT, in botany, a genus of the pentandria-digynia clafs of plants; the compound flower of which is uniform, and the particular ones made up of five oblong and almoft equal petals: the fruit is of an elliptical compreffed figure, marked with three prominent lines on each fide, and containing two feeds of the fame figure. See plate XCVI. fig. 3.

Sagapenum is faid to be the produce of a fpecies of ferula. See SAGAPENUM.

FERULA, a little wooden pallet or flice, reputed the fchoolmafter's fceptre, wherewith he chaftifes the boys, by ftriking them on the palm of the hand.

Under the eaftern empire, the ferula was the emperor's fceptre, as is feen on variety of medals: it confifted of a long ftem or fhank, and a flat fquare head. The ufe of it is very antient among the Greeks, who ufed to call their princes ferula-bearers.

FERULA, in the antient eaftern church, fignified a place feparated from the church, wherein the audientes were kept, as not being allowed to enter the church; whence the name of the place, the perfons therein being under penance or difcipline.

This word was fometimes ufed to denote the prelate's crozier or ftaff. See the article CROZIER.

FERULÆ, in furgery, fplinters or chips of different matter, as of wood, bark, leather, paper, &c. applied to bones that have been disjointed, when they are fet again.

FERULÆ is alfo a word ufed by the antients, to exprefs the horns growing on the deer or ftag at the age of two years, at which early time thofe horns are unbranched.

FESCENNINE VERSES, in roman antiquity, fatyrical verfes, full of lewd and obfcene expreffions, fung by the company at the folemnization of a marriage.

FESCHAMP, a port-town of Normandy, thirty miles fouth-weft of Rouen.

FESSE, in heraldry, one of the nine honourable ordinaries, confifting of a line drawn directly acrofs the fhield, from fide to fide, and containing the third part of it, between the honour-point and the nombril.

It reprefents a broad girdle or belt of honour, which knights at arms were antiently girded with. See plate XCVII. fig. 3.

FESSE POINT, is the exact center of the efcutcheon. See the article POINT.

FESSE WAYS, or *in* FESSE, denotes any thing borne after the manner of a feffe: that is, in a rank acrofs the middle of the fhield.

Party per FESSE, implies a parting acrofs the middle of the fhield, from fide to fide, through the feffe point.

FESTI DIES, in roman antiquity, certain days

days in the year, devoted to the honour of the gods.

Numa, when he diſtributed the year into twelve months, divided the ſame into the dies faſti, dies profeſti, and dies interciſi. The faſti were again divided into days of ſacrifices, banquets, games, and feriæ. See the articles SACRIFICE and FERIÆ.

The profeſti were thoſe days allowed to men for the adminiſtration of their affairs, whether of a public or private nature: theſe were divided into faſti, comitiales, comperendini, ſtati, and prœliares. See the article FASTI, *&c.*

The interciſi were days common both to gods and men, ſome parts of which were alloted to the ſervice of the one, and ſome to that of the other.

FESTINO, in logic, the third mood of the ſecond figure of ſyllogiſm, the firſt propoſition whereof is an univerſal negative, the ſecond a particular affirmative, and the third a particular negative: as in the following example:

FES No bad man can be happy,
TI Some rich men are bad men:
NO *Ergo,* ſome rich men are not happy.

FESTIVAL, the ſame with feaſt. See the article FEAST.

FESTOON, in architecture and ſculpture, *&c.* an ornament in form of a garland of flowers, fruits and leaves, intermixed or twiſted together.

It is in the form of a ſtring or collar, ſomewhat biggeſt in the middle, where it falls down in an arch; being extended by the two ends, the extremities of which hang down perpendicularly.

Feſtoons are now chiefly uſed in friezes, and other vacant places, which want to be filled up and adorned; being done in imitation of the long cluſters of flowers, which the antients placed on the doors of their temples and houſes on feſtival occaſions.

FESTUCA, in botany, a genus of graſſes, belonging to the triandria-digynia claſs; the flower of which is compoſed of two valves, and terminated by a ſtraight ariſta or awn: the ſeed is ſingle, of an oblong figure, very ſharp-pointed at each end, and marked with a longitudinal furrow.

To this genus belong the capon's tail graſs, wild oat graſs, or drank, *&c.* which are ſaid to be drying, and good againſt a ſtinking breath.

FETIPOUR, a city of the hither India, twenty-five miles weſt of Agra: eaſt long. 78° 40', north lat. 27°.

FETLOCK, in the manege, a tuft of hair growing behind the paſtern joint of many horſes; for thoſe of a low ſize have ſcarce any ſuch tuft.

FETUS, or rather FOETUS. See the article FOETUS.

FEUD, *feodum,* the ſame with fee. See the article FEE-ESTATE.

FEUDAL, or FEODAL, denotes any thing belonging to a fee. See the article FEE.

FEUDATARY, or FEODATARY, a tenant who formerly held his eſtate by feodal ſervice. See the article VASSAL.

FEUD-BOTE, a recompence for being concerned in a feud or quarrel.

FEVER, *febris,* in medicine, a diſeaſe, or rather claſs of diſeaſes, whoſe characteriſtic is a preternatural heat felt through the whole body, or at leaſt the principal parts of it. According to Sydenham, a fever is nothing elſe but the effort of nature, to free herſelf of ſome morbific matter, which ſhe finds injurious, in order to eſtabliſh a better health.

If any diſeaſe deſerves the title of univerſal, it is a fever, becauſe it diſturbs the whole nervous ſyſtem, and perverts all the functions of the body, inſomuch that the motion of the heart, arteries and ſolids ceaſe to be equal and juſt; the circulation of the blood and other fluids, to be free and natural; and the ſalutary ſecretions and excretions, to be regular; even the mind itſelf, when ruffled by the febrile onſet, is affected with a delirium. Beſides, this diſeaſe attacks all mankind, of what conſtitution, ſex, or age, in all climates, let their diet and way of living be what they will: ſometimes it is epidemic, and ſeizes many at a time. A fever is not always a primary diſeaſe, but is often the ſymptom of other maladies, as a cachexy, ſcurvy, phthiſis, lues venerea, dropſy, *&c.* and renders them more cruel and dangerous; however, it is not always pernicious to the human race, but ſometimes vanquiſhes its own cauſe, and ſupervening to other diſeaſes, expels them out of the body: thus palſies, epilepſies, convulſions, ſpaſmodic and hypochondriac affections, have been cured by fevers; and many valetudinarians have, by a fever, been reſtored to a healthful and vigorous conſtitution.

Hence the moſt general and natural diviſion of fevers, is into eſſential and ſymptomatic.

An eſſential fever is ſuch whoſe primary cauſe lies in the blood itſelf, deriving its original

original from no other diftemper of the folid parts, or any way depending on them; and this is abfolutely fpeaking a fever properly fo called.

A fymptomatic is a fecondary fever, which does not properly fubfift of itfelf, but owes its origin to the diforder of fome particular part, and moft commonly depends on fome remarkable inflammation; from whence proceed the variety of inflammatory fevers, peculiarly fo called.

The general caufes of FEVERS. "The "caufe of fevers is not heat alone, fays "Hippocrates, *de vet. medic.* but heat "and bitternefs together, heat and aci- "dity, heat and faltnefs, and innume- "rable other combinations in the blood." It is found, neverthelefs, by experience, that fome perfons, from found and perfect health, where there has been neither a plethora or any cacochymical difpofitions to caufe it, have fallen into a fever, becaufe, perhaps, fome very extraordinary alteration in the air, or fome great change in their way of living, or fome confiderable error in the fix non-naturals, have happened. Sound bodies may, on fuch occafions, be feized with a fever, only to the end that their blood may acquire a new ftate and condition, thereby to accommodate itfelf to the alterations of the air, way of living, *&c.*

The formal or fundamental caufe of a fever, confifts in the fpafmodic affection of the whole nervous and fibrous genus, which chiefly proceeds from the fpinal marrow, and fucceffively from the external to the internal parts: this plainly appears from the ufual paffions and phænomena of a fever. Hence it naturally follows, that whatever has a power to irritate and folicite the nervous and vafcular fyftem to fpafms, is moft likely to generate a fever. To this clafs belong violent paffions of the mind, efpecially terror and anger; a poifonous, fubtile, cauftic matter, either bred within the body, or received by infection; a ftoppage of perfpiration; a fuppreffion of critical fweats; eruptions driven back; an abundance of purulent, ulcerous matter, adhering to various parts; aliments over and above acrid and falt; abufe of fpirituous liquors; corrupt and bilious crudities lodged in the primæ viæ; exceffive watching; a violent pain and tenfion of the nervous parts; inflammations; tumours and abfceffes; hurting the nervous parts by fharp inftruments; acrid and corrofive drugs; cold baths; and, on the contrary, thofe that are too hot or aftringent.

According to the different nature of thefe caufes, and their various manner of affecting the nerves, arife fevers of divers kinds; fome are benign, others malignant; fome are intermitting, others continual; fome are fimple, others are compound; fome are regular, others anomalous; others eruptive, fpotted, putrid, hectic, or flow; fome admit of an eafy cure, others a difficult; fome foon terminate, others are protracted a long time, and fome again hurry the patient out of the world.

The general figns of FEVERS are a pain in the back, more particularly about the loins; a coldnefs, efpecially of the extreme parts; a fhivering; a fhaking; trembling; a livid colour of the nails; a fubfidence of the veffels in the hands and feet; a fhrunk, dry fkin; a yawning; a ftretching; a pale livid countenance; a trembling and palpitating motion of the heart; an anxiety of the præcordia; difficult breathing; inquietude, reftleffnefs, a fenfation of an ebullition of the blood about the heart; a contracted, weak, fmall pulfe; a naufea, and an inclination to vomit; a fuppreffion of perfpiration; coftivenefs, with thin watery urine. When the fymptoms are very urgent, and very haftily make their progrefs, the fever is called acute; when they are more mild and gentle, it is denominated a flow fever.

The general cure of FEVERS is fummarily comprehended in confulting the ftrength of nature, in correcting and difcharging the acrimony from the blood, in diffolving grofs humours, and expelling them, and in mitigating the fymptoms. If we perceive the fymptoms run high, and nature to grow exorbitant, we muft moderate it, and enjoin abftinence, a flender diet, drinking water, bleeding, cooling clyfters, *&c.* If nature feems to be too fluggifh, fhe is to be excited by cordials, aromatics, volatiles, *&c.*

By how much the more acute a fever is, by fo much the more fparing and flender ought the diet to be. In fevers, though the patient lies many days without eating any thing, it is no matter: on the contrary, by eating and drinking, the fever would be exafperated.

Vomits in almoft all fevers are of advantage, efpecially in the beginning. Even nature herfelf teaches us the ufe of fudorifics; they are moft beneficial when the

the figns of concoction appear; and they are alfo ufeful through the whole courfe of the diftemper; yea, even by the promifcuous ufe of them, fevers are often cured. Spirit of fal armoniac, or its volatile falt, is efteemed an univerfal febrifuge, which, being given pretty often, feldom fails of fuccefs. All fugared things are very hurtful in fevers.

In acute and inflammatory fevers, but a very few medicines are required; for it will be fufficient diligently to obferve the ways that nature aims to relieve herfelf by, and to forward the cure in thofe ways, by affifting her. If there be any obftructions in the bowels, we are to take care, by proper evacuations, to remove the load, and by that means take away fome of the fuel of the diftemper. If the blood be too furioufly agitated, we are to quell fuch an impetuofity: if it be embarraffed with grofs and coagulated humours, we are to endeavour at diffolving it, and rendering it more fluid. In the due obfervation of thefe three precepts, confifts, in a great meafure, the whole cure of fevers, where the vifcera are found, and the peccant humours are lodged in the blood, or in the primæ viæ; and then, when nature tends to produce a crifis, or fhe has already begun it, we are altogether to refrain from the ufe of medicines, as much as we would avoid the plague.

They are grofsly miftaken who, in acute and inflammatory diforders, make ufe of abundance of medicines fo long, till nature, not knowing which way to turn herfelf, but being varioufly diftracted to and fro, both by the violence of the diftemper and the burden of the medicines, is at laft forced to yield: for the orderly motion of nature being difturbed and diftracted with the repetition of much medicines immethodically given, the fever is not leffened, and the crifis is poftponed; and the patient, expofed to a dubious event, either dies, or falls into a chronical diftemper.

Therefore, fince nature is the phyfician, it is a pernicious practice to fufpend, fupprefs, or deftroy the febrile motions, which have a tendency to health. The moft falutary work of nature ought rather to be promoted, which defigns, by an increafed progreffive motion of the fluids, to correct, refolve, and at length to expel the morbific matter. And this is beft performed by diluting, moiftening, attemperating, aperient, corroborating and nitrous medicines; as alfo by thofe which in the time of the intermiffion, efpecially tend to promote the proper excretions.

In all fevers, the drinking plentifully of warm weak liquors, is attended with many good confequences: the patient is always refrefhed by it; the febrile heat is mitigated, and reft is promoted; and the proper and neceffary fweats forwarded. Among thefe liquors, the common barley-water, teas made of fage, mint, baum, *&c.* with the milder alexipharmic roots, are moft proper: with thefe, powders are to be given, compofed of the abfterfive and digeftive falts: they fhould be fated with lemon-juice, and then mixed with a little nitre, and may be given every three, four, or fix hours, as the urgency of fymptoms require. Emulfions of fweet almonds, and the cooling feeds, are alfo very proper between whiles.

The medicines by which the phyfician is to affift nature in her bufinefs of excretion, are the gentle diaphoretics; among which the diaphoretic antimony, when truly prepared, holds a very high place: alexipharmics, which have alfo a diuretic virtue, fuch as the mixtura fimplex, when faithfully prepared and lightly camphorated, are very proper. All violent medicines are to be dreaded in fevers. Acids, in general, are by many much dreaded, but there is no real ground for this; on the contrary, in fanguineous fevers, during the time of the violent heat, and immoderate thirft, they are found of the greateft ufe and benefit. The ufe of aftringent medicines, though too common, yet is extremely improper in all fevers. Nitre is an admirable remedy for fevers in general.

The general crifis of FEVERS. Whereas there is no fever cured without fome confiderable evacuation, raifed either by nature or by art, the phyfician ought carefully to obferve which way nature feems to intend the expulfion of the morbid matter, and affift her by all poffible means. Now this expulfion is frequently made through feveral outlets of the body at a time, and an evacuation by one outlet, more or lefs, checks that by another: thus a loofenefs checks fweat, and *vice verfa.* Wherefore it is the phyfician's bufinefs to confider what evacuation is moft likely to be of fervice, and fo to promote this, as to give the leaft interruption poffible to any other, for any one evacuation is not equally fuitable to all perfons, both on account of

of the difference of conftitutions, and of difeafes; although evacuations through every emunćtory, are fometimes neceffary, as we find by experience in malignant fevers.

But of all folutions of the difeafe, the moft defirable is by fweat; next to that, by ftool and urine: the worft is by a hæmorrhage, whether it proceeds from the nofe, or from any other part, becaufe it indicates that the blood is fo far vitiated, that no proper feparation of the humour can be made.

Laftly, fome fevers terminate in abfceffes, formed in the glands, which, if they happen in the decline of the difeafe, and fuppurate kindly, are falutary. Wherefore the fuppuration is to be forwarded by cataplafms, or plafters; and fometimes by cupping on the tumor; and then, if the abfcefs do not break fpontaneoufly, it ought to be opened, either with a knife, or with a cauftic. At this time this rule of praćtice is generally right, not to exhauft the patient's ftrength by evacuations of any kind. And yet in fome cafes there is a neceffity for drawing a little blood, as when the humours are in great commotion, and the heat exceffive: for this remedy prudently adminiftred, makes the tumor ripen kindly, becaufe nature has always a great abhorrence of a turbulent ftate.

But in order to give a more diftinćt notion of the feveral kinds of fevers, it will be neceffary to treat them particularly.

Bilious FEVER. See the article BILIOUS.

Burning FEVER, CAUSUS, attacks the patient with great fury and rage, with an exceffive burning heat, an intolerable thirft, and other fymptoms demonftrating a great and remarkable inflammation of the blood; the refpiration is thick, difficult, and quick; the tongue is dry, yellow, parched and rough; there is a loathing of food, a naufea and vomiting, a little cough, a delirium, a coma, convulfions, and other general fymptoms already mentioned.

On the third and fourth day it often proves mortal; it feldom exceeds the feventh, if violent.

It is often terminated by a hæmorrhage, which, if fmall on the third and fourth day, is a fatal fign. A folution of this fever, on a critical day, may alfo be by vomiting, ftool, fweat, urine, and fpitting thick phlegm. If the exacerbation of this difeafe happens on the fecond or fourth day, it is a bad fign, on the fixth not fo bad.

As to the cure of a burning fever, fo far as it differs from the general treatment already prefcribed, bleeding is neceffary at the beginning, if there is a plethora, or figns of particular inflammation; or the heat intolerable, or the rarefaćtion too great, or a revulfion neceffary, or the fymptoms urgent, and not to be vanquifhed any other way.

Soft, diluting, laxative, antiphlogiftic, cooling clyfters, are to be repeated as oft as the heat, coftivenefs and revulfion requires them; the whole body is to be moiftened by receiving into the noftrils the fteam of warm water, by wafhing the mouth, throat, feet, and hands with the fame; and by fomenting with warm fponges the places where the veffels are moft numerous. Purgatives are dangerous before the crifis, but clyfters may be ufed made of milk, honey, and a little nitre. After the crifis, which is known by the fediment of the urine, laxatives made with tamarinds, manna, rhubarb, raifins, or cream of tartar, are neceffary. If a phrenfy happen, caufe bleeding of the nofe, by thrufting up a ftraw, or with a fcarifying knife: ufe alfo frićtions of the feet and legs, with hot cloths.

Catarrhal FEVER may be reckoned in the clafs of flow fevers, which, in the beginning, is attended with a catarrh, a coryza, cough, hoarfenefs, *&c.* Thefe fevers are moft commonly gentle and flow by day-time, generally fomewhat worfe in the evenings: they are attended with a great wearinefs of the limbs, the fymptoms continue with an increafe of the coryza and cough, until the diftemper arifes to its higheft pitch, when the matter of the catarrh is ripened, and the mucus, becoming thicker, is difcharged, and the fever ceafes: the feat of this diftemper is in the conglobate glands.

In a catarrhal fever a decoćtion of faffafras wood is convenient, with liquorice roots and raifins, on account of the acrimony of the humours. Alfo the expreffed juice of turnips, with a little fugar; volatiles and fudorifics, a folution of gum ammoniac; and for the further treatment of this diforder, fee the article CATARRH.

Colliquative FEVER is that in which the body is much emaciated and confumed in a fhort fpace of time, the folid parts, and the fat itfelf wafted, fometimes by a diar-

a diarrhoea, sometimes by sweat, by urine, or by feverish heats alone, without any sensible discharge. A colliquative fever is observed to accompany a cancer of the breast, with a diarrhoea. See the articles DIARRHOEA, DIABETES, CANCER, *&c.*

For this disease, emulsions of almonds, and of the four cold seeds, as also ass's, goat's, or woman's milk, are proper; or cow's milk with the juice of water-cresses; chicken broth, broth made of river crabs, or wood snails bruised.

Continual FEVER, the same with synochus. See the article SYNOCHUS.

Diary FEVER, the same with ephemera. See the article EPHEMERA.

Epidemic EEVER. See EPIDEMIC.

Eruptive FEVER. See the articles MILIARY FEVER, ERYSIPELAS, *&c.*

Gaol, camp, or *hospital* FEVER. See the article HOSPITAL FEVER.

Hectic FEVER. See HECTIC FEVER.

Hypochondriac FEVER, or PASSION. See HYPOCHONDRIAC PASSION.

Inflammatory FEVER. See the article INFLAMMATORY.

Intermitting FEVER. See INTERMITTING, QUOTIDIAN, TERTIAN, *&c.*

Malignant FEVER. See the articles MALIGNANT, PETECHIÆ, HOSPITAL FEVER, and MILIARY FEVER.

Mesenteric FEVER. See MESENTERIC.

Miliary FEVER. See MILIARY.

Milk FEVER. See the article MILK.

Nervous FEVER, at first, affects the patient with a slight, transient chilness, several times in a day; also with uncertain flushes of heat, a listlesness, lassitude, and wearines.

The patient has a drines of the lips and tongue, without any considerable thirst: they have frequent nauseas, with reaching to vomit, but little brought up: the breathing is difficult by intervals, and especially towards night: there is an exacerbation of the symptoms, with a low, quick, and unusual pulse: the urine is pale, and made often, and suddenly; a torpor or obtuse pain, and coldness often affect the hind part of the head, or a heavy pain is felt along the coronary suture. The pulse is very remarkable in this disease, for it is generally low, quick and unequal.

Gilchrist makes this state previous to the fever, and says, that for a fortnight, or three weeks, before they are laid down, they shall be low-spirited, inappetent, loaded, sleep ill, sigh frequently, groan involuntarily, and feel unexpressible disorder, accompanied with fear, concern, and dejection, and perhaps slight alienations of mind. The same author says, that this disorder is frequently occasioned by people exposing themselves indiscretly to the sun, or by being fatigued in it; by eating largely of fruit, or drinking bad wine; or by being long under a course of anxiety, care, fear, discouragement, and other enervating passions, together with irregularities of diet, *&c.* It commonly attacks people of weak nerves, and a lax habit of body, and is occasioned by an acrimony that gives an universal stimulus.

The cure is to be performed with gentle volatile medicines of the cordial and diaphoretic kind, in order to promote perspiration, by the application of blisters, and by a proper regimen and method of diet. In the beginning a gentle emetic may be given, or a small dose of rhubarb; when it has continued long, bleeding and sweating is very prejudicial. In giving the diaphoretic, we should always have regard to the urine, for if that from being pale, gradually heightens to an amber colour, we are right in our dose, especially if, in bed, a gentle dew or moisture comes on, without a restlesness. A little chicken broth is of service, both as food and physic, especially towards the decline of the disorder. Also, thin jellies of hartshorn, sago, panado, adding a little wine to them; at this time also, if the sweats are copious and weakening, it is proper to give small doses of the tincture of the bark, with saffron and snake-root, interposing now and then a dose of rhubarb, to carry off the putrid colluvies.

Peripneumonic FEVER. See the article PERIPNEUMONY.

Pestilential FEVER. See PLAGUE.

Petechial FEVER. See the articles PETECHIÆ and MALIGNANT.

Pituitous FEVER, the same with catarrhal *supra.*

Scarlet FEVER. See SCARLET.

Scorbutic FEVER. See SCURVY.

Slow FEVER, much resembles the hectic fever, but has milder symptoms, and a gentler heat than the hectic. See the article HECTIC.

This fever is attended with profuse sweats after sleeping; after which, and before noon, the pulse is natural, as in the hectic; but there is not such a want of appetite, nor excessive weakness, nor dry-

nes

nefs of the fkin, nor fuch dark coloured urine, nor fuch danger, as in the hectic.

The caufe of a flow fever lies moftly in the fluids. It arifes from obftinate intermittent, or continual fevers; from the fmall-pox and meafles; from profufe hæmorrhages; from long diarrhœas, dyfenteries; from an exceffive falivation, gonorrhœa, or fluor albus; from care, watching, intenfe ftudy, hard, continual labour, inordinate coition, or the abufe of fpirituous liquors. In the cure of this difeafe refpect muft always be had to the caufe. If it proceeds from crudities, it is known by a languid feeblenefs, internal heat, propenfity to fweat, efpecially in the balls of the hands, and foles of the feet; in which cafe the ftomach and parts adjacent muft be cleanfed from the fordes by a gentle vomit of ipecacuanha. After the alimentary canal is cleanfed, you muft proceed to analeptics and ftomachics.

If the diforder is in the hypochondria, when the patient is plethoric, cacochymical, cachectical, or fcorbutical, or the menfes or hemorrhoidal evacuations are ftopped, and occafion this diforder; or, if it proceeds from voraciousnefs, or bad diet, or the abufe of fpirituous liquors, then endeavours muft be made to free the liver, fpleen, and mefentery, and its veffels and glands from obftructions: for this purpofe mineral waters are proper; as are alfo the thermæ, or hot bath waters. Where thefe cannot be had a decoction of thin veal broth, with the roots of fuccory, fennel, afparagus, dog-grafs, and viper's grafs, are proper; drinking a quart a day for fome weeks; and before it fome preparations of fteel, as the tincture of fteel, or of martial flowers.

If from an erofion of the ftomach and bowels, all fharp, falt, and ftimulating things are as bad as poifon. In this cafe a decoction of faffafras, and the bark of eleutherius in milk, as alfo chamomile flowers, and the tops of yarrow, drank about a quart a day, are of great ufe: as are alfo the root of marfh mallows, or rice boiled in milk; or gum dragant, diffolved in water.

If from the lofs of neceffary fluids, and want of ftrength, then it may be termed a colliquative fever, and muft be treated as already directed in the treatment of that fever, above.

If it proceeds from the abufe of fpirituous liquors, all heating liquors fhould be avoided, as alfo analeptics and ftomachics. Gruel will be proper, with fuccory root, red poppy flowers, and fome ftibiated nitre.

If this fever proceeds from a fuppreffion of the menfes, it requires immediate bleeding in the foot, and refolvent decoctions of fuccory-roots, leaves of fowthiftles, daifies, and elder-flowers, forbearing all ftrong emmenagogues.

If from a marafmus fenilis, and that the patient has been addicted to a fedentary inactive life, his appetite remaining good, and has omitted accuftomary bleeding, or the fpontaneous evacuations of blood are ceafed, bleeding is indicated, and wholefome diluters muft be freely drank, abftaining from food of too plentiful nourifhment, and ufing convenient exercife; but if the diforder proceeds from a plenty of impure falt ferum, not fecreted through the fkin, or otherwife, the fordes muft be carried off by gentle laxatives of manna, rhubarb and raifins, and the rofcid juices muft be renewed by jellies and affes milk.

Synochus FEVER. See SYNOCHUS.

Yellow FEVER. See the article BILIOUS FEVER.

FEVERS *of children* are all owing to acidity, the primary caufe of all the diforders that affect them; and the whole cure depends upon vanquifhing that enemy.

This is to be done two ways; the firft is to prepare the acidity, and render it fit for expulfion; and then to purge it away by fuitable evacuants. To prepare the acid does not require fudorifics, but abforbents; and though thefe are numerous, the powder of crab's claws is the chief. Purging to fome may feem dangerous, but Sydenham has fhewn us, that it is fafe and falutary in the fevers of adults, infomuch that he depends entirely upon it for the cure of the epidemic winter-fever; and it has been found of excellent ufe in the fevers of children. They recommend in this cafe a pearl julep, made by adding a dram of prepared pearls to two ounces of the fimple waters, and two drams of the compound; the dofe is three fpoonfuls. When there is any unufual fymptoms arifing from putrid humours, they prefcribe about fix grains of æthiops mineral the night before the purge, in a fmall fpoonful of any agreeable fyrup. After the purge, the teftaceous powders are to be given three or four times in twenty-four hours for two days and nights, and then the purge is to be repeated.

FEVERFEW, the english name of a plant, called by botanists matricaria. See the article MATRICARIA.

Bastard-FEVERFEW. See PARTHENIUM.

FEVERSHAM, a port-town of Kent, and one of the cinqueports. See the article CINQUEPORT.

It stands seven miles west of Canterbury.

FEUILLANS, an order of bare-footed monks, who observe the same rules with the bernardines. See BERNARDINES.

FEUILLE DE SCIE, among the french heralds, imports that an ordinary, as a fesse or a pale, is indented only on one side; so called on account of its resemblance to a saw-blade, as the words signify.

FEVILLEA, in botany, a genus of the monoecia syngenesia class of plants, the flower of which is monopetalous, divided into five segments at the limb, and rotated: the fruit is a very long fleshy berry, with a hard rind, and containing compressed orbicular seeds. It is called by Plumier, *nhandiroba.*

FEURS, a town of France, situated on the river Loyre, twenty-seven miles west of Lyons.

FEWEL, or FUEL. See the article FUEL.

FEZ, the capital of the empire of Fez and Morocco, in Africa: west longitude 6°, north latitude 33° 30′.

It is a large and populous city, and the usual residence of the emperor. See the article MOROCCO.

FIASCONE, a city and bishop's see of Italy, about twelve miles south of Orvietto.

FIAT, in law, a short order or warrant signed by a judge, for making out and allowing certain processes.

FIAT JUSTITIA, is where the king, on a petition to him for his warrant to bring a writ of error in parliament, writes on the top of it *fiat justitia,* let justice be done; upon which the writ of error is made out.

FIBER, the beaver, in zoology, is made, by Linnæus, a species of castor. See the article CASTOR.

FIBRARIÆ, a class of fossils, naturally and essentially simple, not inflammable nor soluble in water, and composed of parallel fibres, some shorter, others longer; their external appearance being bright, and in some degree transparent: add to this, that they never give fire with steel, nor ferment with, or are soluble in acid menstrua.

To this class belong the asbestus, amianthus, tricheriæ, and lachnides. See the articles ASBESTUS, AMIANTHUS, &c.

FIBRE, in anatomy, a perfectly simple body, or at least as simple as any thing in the human structure; being fine and slender like a thread, and serving to form other parts. Hence some fibres are hard, as the bony ones; and others soft, as those destined for the formation of all the other parts.

The fibres are divided also, according to their situation, into such as are straight, oblique, transverse, annual, and spiral; being found arranged in all these directions, in different parts of the body, for an account of which see BONE, MUSCLE, NERVE, ARTERY, VEIN, &c.

FIBRE is also used to denote the slender filaments which compose other bodies, whether animal, vegetable, or mineral; but more especially, the capillary roots of plants. See PLANT, WOOD, &c.

FIBRILLA, a term sometimes used for a very minute or slender fibre.

FIBROSE, something consisting of fibres, as the roots of plants. See ROOT.

FIBULA, in anatomy, the outer and smaller bone of the leg, called also perone. It is nearly of a triangular figure, and stands parallel to, but distant from the tibia, or inner bone of the leg. Its upper extremity does not reach to the os femoris, but is only joined to the external side of the tibia; and its lower extremity, called malleolus externus, concurs in the articulation of the tarsus, which its eminence serves to strengthen, by rendering a luxation less easy. It has no particular motion of its own, but wholly follows that of the tibia.

Fractures of the FIBULA. See the article FRACTURE.

Luxation of the FIBULA. Sometimes the fibula is separated by external violence from the thigh-bone, and is then distorted either upwards or downwards; this generally happens, when the foot has been luxated outwards. Whenever this happens, the bone is to be first restored to its natural place, and then properly bound up, and left to the assistance of nature and rest, till it be grown firm again to the tibia and leg. Heister directs, that the patient, in this and the like cases, be always strictly cautioned not to use or bear any stress upon the disordered leg too soon; the consequence of which may be worse than the first misfortune. For the rest of the treatment, see the article LUXATION.

FIBULÆUS, a muſcle of the leg, more uſually called peronæus. See PERONÆUS.

FICARIA, in botany, the name by which Dillenius calls a ſpecies of ranunculus, called by Boerhaave chelidonium minus. See the article RANUNCULUS.

FICEDULA, in ornithology, a name given to ſeveral ſpecies of motacilla, particularly the brown kind, with a ſpotted breaſt, and white belly. See MOTACILLA.

FICHE', or FITCHE'E, in heraldry. See the article FITCHE'E.

FICOIDES, a name given to ſeveral diſtinct plants, as the meſembryanthemum, muſa, and opuntia. See the article MESEMBRYANTHEMUM, &c.

FICTION. See the article FABLE.

FICUS, the FIG-TREE, in botany, a genus of the cryptogamia claſs of plants, producing male and female flowers ſeparate, neither of which have any flower-leaves: the ſtamina are three ſetaceous filaments, of the length of the cup; and the fruit is large, fleſhy, and of a turbinated figure; being properly nothing but the common calyx or cup of the fructification. See the article FIG.

FIDA, a town on the ſlave-coaſt of Guinea: eaſt long. 3°, and north lat. 6°.

FIDD, in the ſea-language, an iron, or wooden pin, to ſplice and faſten ropes together. It is made taper-wiſe, and ſharp at one end. The pin in the heel of the top-maſt, which bears upon the cheſſe-trees, is likewiſe called a fidd.

FIDD HAMMER, one whoſe handle is a fidd, or made taper-wiſe.

FIDDLE, or VIOLIN. See VIOLIN.

FIDE JUSSOR, among civilians, the ſame with a ſurety. See the article SURETY.

FIDEI COMMISSUM, in roman antiquity, an eſtate left in truſt with one perſon, for the uſe of another. See TRUSTEE.

FIDICINALES, muſcles of the fingers, otherwiſe called lumbricales. See the article LUMBRICAL.

FIEF, or FEE. See the article FEE.

FIELD, *campus*, in agriculture, a piece of ground incloſed, whether for tillage or paſture.

The ſquare contents, or ſuperficies, of a field may be eaſily found, by the rules of ſurveying. See SURVEYING.

FIELD, in antiquity, the ſame with campus. See the article CAMPUS.

FIELD, in heraldry, is the whole ſurface of the ſhield, or the continent, ſo called becauſe it containeth thoſe atchievements antiently acquired in the field of battle. It is the ground on which the colours, bearings, metals, furs, charges, &c. are repreſented. Among the modern heralds, field is leſs frequently uſed in blazoning than ſhield or eſcutcheon. See the article SHIELD, &c.

FIELD, in a military ſenſe, denotes the place where a battle was fought.

Cloſe FIELD was antiently a place railed in with a barrier, for the performance of juſts and tournaments.

FIELD, among painters, is more uſually called ground. See the article GROUND.

FIELD-BOOK, in ſurveying, that wherein the angles, ſtations, diſtances, &c. are ſet down. See SURVEYING.

FIELD-COLOURS, in war, are ſmall flags of about a foot and a half ſquare, which are carried along with the quarter-maſter general, for marking out the ground for the ſquadrons and battalions.

FIELD-FARE, in ornithology, the engliſh name of the variegated turdus, with a hoary head. See the article TURDUS.

It is larger than the common black-bird, and with us is a bird of paſſage, coming over in great numbers in winter. See plate XCVII. fig. 4.

FIELD-FORT, in fortification. See FORT.

FIELD-OFFICERS, in the art of war. See the article OFFICER.

FIELD-PIECES, ſmall cannons, from three to twelve pounders, carried along with an army in the field. See CANNON.

FIELD-STAFF, a weapon carried by the gunners, about the length of a halbert, with a ſpear at the end; having on each ſide, ears ſcrewed on, like the cock of a match-lock, where the gunners ſcrew in lighted matches, when they are upon command; and then the field-ſtaffs are ſaid to be armed.

FIELD-WORKS, in fortification, are thoſe thrown up by an army in beſieging a fortreſs, or by the beſieged to defend the place. Such are the fortifications of camps, highways, &c.

Elyſian FIELDS. See ELYSIUM.

FIERENZUOLO, a town of Italy, ten miles ſouth-eaſt of Placentia.

FIERI FACIAS, in law, a writ that lies where a perſon has recovered judgment for debt or damages in the king's courts againſt one, by which the ſheriff is commanded to levy the debt and damages on the defendant's goods and chattels. This writ muſt be ſued out within a year and a day after the judgment obtained, and where two fieri facias's againſt one perſon are delivered to the ſheriff the ſame day, he ought to exe-

cute that first which was first delivered; but if he executes the last first, the execution will be good, though the other party in such case may have an action against him.

FIFE, in music, is a sort of wind instrument, being a small pipe.

FIFE, in geography, a county of Scotland, bounded by the Frith of Tay on the north; by the German sea on the east; by the Frith of Forth on the south, and by Menteeth and Sterling on the west.

FIFE-RAILS, in a ship, are those that are placed on banisters, on each side of the top of the poop, and so along with hances or falls.

They reach down to the quarter-decks, and to the stair of the gang-way.

FIFTEENTH, an antient tribute or tax laid upon cities, boroughs, *&c.* through all England, and so termed because it amounted to a fifteenth part of what each city or town had been valued at; or it was a fifteenth of every man's personal estate according to a reasonable valuation. In Doomsday book, there are certain rates mentioned for levying this tribute yearly; but since, any such tax cannot be levied but by parliament.

FIFTH, in music, one of the harmonical intervals or concords. See the article INTERVAL.

The fifth is the second in order of the concords, the ratio of the chord that affords it is 3 : 2. See the articles CHORD and CONCORD.

It is called a fifth, as containing five terms or sounds between its extremes, and four degrees, so that in the natural scale of music, it comes in the fifth place or order from the fundamental. The antients called this fifth diapente. The imperfect and defective fifth called by the antients semi-diapente is less than the fifth by a lesser semitone. See the articles DIAPENTE, SEMITONE, *&c.*

FIG, the fruit of the ficus, or fig-tree. See the article FICUS.

Figs, as well fresh as when dry, are very wholesome food: they are nutritive and emollient: they are good also in the disorders of the breast and lungs; but it is to be observed, that a too free use of them has sometimes brought on obstructions of the viscera, which are very common complaints also where they are eaten as food, as they are with bread by the poor people in many parts of the Levant. They are frequently made ingredients in our pectoral decoctions, and are by some greatly recommended against nephritic complaints. They are much used externally by way of cataplasm, either roasted or boiled in milk, for the ripening of tumours, and for easing the pain of the piles. Figs should be chosen large, of a pale brownish colour, soft and mellow, heavy, and when broken, with the pulpy substance yellowish and sweet, and of a soft glutinous texture.

Figs the hundred weight pay on importation 9s. $6\frac{5}{100}$d. the drawback on exportation is 8s. 9d. at the rate of 6l. the hundred weight.

FIG, in farriery, a sort of wart on the frush, and sometimes all over the body of a horse. The figs that appear on the frush or sole make an evacuation of malignant stinking humours that are very hard to cure.

FIG-SHELL, a species of dolium. See the article DOLIUM.

FIGWORT, a plant called by the botanists scrophularia. See SCROPHULARIA.

Indian FIG. } See { OPUNTIA.
Infernal FIG. } See { ARGEMONE.

Marygold FIG. See MESEMBRYANTHEMUM.

Pharaoh's FIG. See the article MUSA.

FIGHT, or *Sea*-FIGHT. See BATTLE.

Running-FIGHT, that in which the enemy are continually chased.

FIGHTS, in a ship, are the waste clothes hung round about a ship in a fight, to keep the men from being seen by the enemy.

Close FIGHTS, the bulk-heads, fore and aft the ship, put up for the men to stand secure behind in case of boarding, and fire upon the enemy.

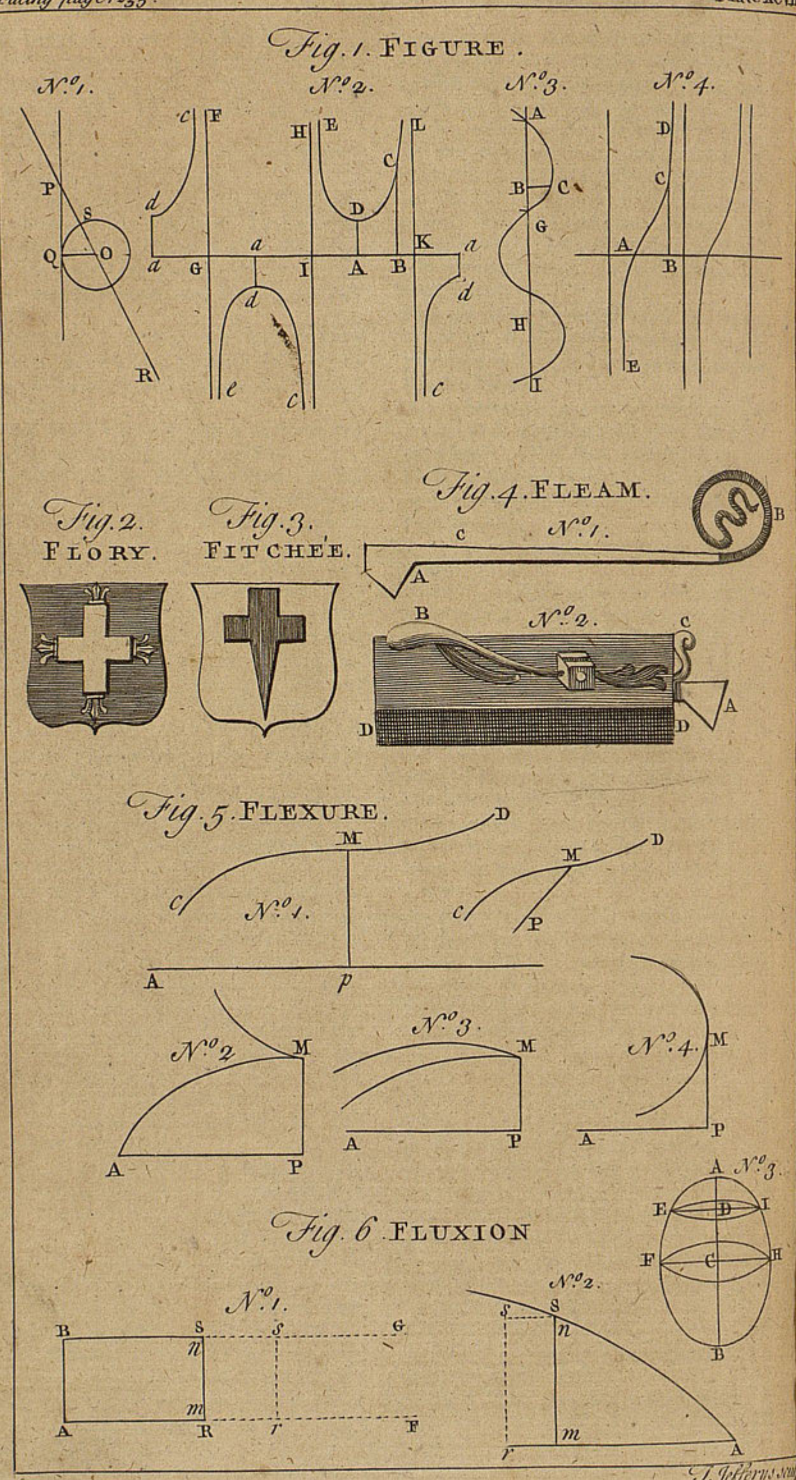
FIGHTWITE, a fine or mulct for fighting or creating a quarrel.

FIGUERRE, a town of Catalonia in Spain, ten miles west of Roses.

FIGURAL, FIGURATE, or FIGURATIVE, a term applied to whatever is expressed by obscure resemblances. The word is chiefly applied to the types and mysteries of the mosaic law; as also to any expression which is not taken in its primary and literal sense.

FIGURAL, or FIGURATE NUMBERS, are such as do or may represent some geometrical figure in relation to which they are always considered, as triangular numbers, pentagonal numbers, pyramidal numbers, *&c.*

FIGURATIVE, among grammarians, is the


Fig. 1. FIGURE.
N.º 1.
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S
Q
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N.º 2.
c
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N.º 3.
A
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G
H
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N.º 4.
D
C
A
B
E
Fig. 2. FLORY.
Fig. 3. FITCHEE.
Fig. 4. FLEAM.
N.º 1.
B
C
A
N.º 2.
D
Fig. 5. FLEXURE.
D
M
C
N.º 1.
P
A
p
N.º 2
N.º 3.
N.º 4.
Fig. 6 FLUXION
N.º 1.
B
S
s
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n
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R
r
F
N.º 2.
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N.º 3
E
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H
T. Jefferys sculp.

the fame with what is otherwife called charaćteriftic. See CHARACTERISTIC.

FIGURATIVE COUNTERPOINT, in mufic, is that wherein there is a mixture of difcords along with the concords. See the article COUNTERPOINT.

The French call it fuppofition, becaufe the tranfient difcords fuppofe a concord immediately following. See the article SUPPOSITION.

FIGURATIVE DESCANT, in mufic. See the article DESCANT.

FIGURE, in phyfics, expreffes the furface or terminating extremities of any body; and confidered as a property of body affećting our fenfes, is defined a quality which may be perceived by two of the outward fenfes. Thus a table is known to be fquare by the fight, and by the touch. The fchoolmen therefore difpute whether or no the quality of figure be the fame with that of form. Boethius affirms, that figure ought to be predicated of inanimate bodies, and form of animate: others again extend form to all natural bodies, and figure to all artificial ones: in the opinion of others, form and figure are applied to all forts of bodies, but not in all relations. If only the bare circumference or circumfcription be confidered, they call it figure; but if the circumference be confidered as endued with colour, then they call it form. See the article FORM.

FIGURES, in arithmetic, are certain charaćters whereby we denote any number which may be expreffed by any combination of the nine digits, &c. See the article DIGIT.

FIGURE, in architećture, and fculpture fignifies the reprefentation of things made in folid matter, as ftatues, &c. Daviler obferves, that thofe reprefentations of human bodies fitting, as popes, or kneeling, as on monuments, or lying as river-gods, &c. are more properly called figures than ftatues.

FIGURE, in aftrology, a defcription of the difpofition of the heavens at a certain hour, in which the places of the planets and ftars are marked in a figure of twelve triangles, called houfes. See HOUSE.

FIGURE, in conic fećtions, according to Apollonius, is the rećtangle made under the latus rećtum and tranfverfum in the hyperbola and ellipfis.

FIGURE of the diameter; the rećtangle under any diameter, and its proper parameter is, in the ellipfis and hyperbola, called the figure of that diameter.

FIGURE, among divines, is ufed for the myfteries reprefented under certain types. See the article TYPE.

FIGURE, in dancing, denotes the feveral fteps which the dancer makes in order and cadence, confidered as they mark certain figures on the floor.

FIGURE, in fortification, the plan of any fortified place, or the interior polygon, which, when the fides and angles are equal, is called a *regular*, and when unequal, an *irregular* figure.

FIGURE, in geometry, the fuperficies included between one or more lines, is denominated either rećtilinear, curvilinear, or mixt, according as the extremities are bounded by right lines, curve lines, or both. See the articles RECTILINEAR, &c.

Equilateral FIGURE. See EQUILATERAL.

Circumfcribed FIGURE. See CIRCUMSCRIBED.

Infcribed FIGURE. See INSCRIBED.

Similar FIGURE, &c. See SIMILAR, &c.

FIGURE, in the higher geometry, a term applied to three mechanical curves, called the figure of the fecants, figure of the fines, figure of the tangents.

FIGURE *of the fecants*, is generated thus. Let P Q (plate XCVIII. fig. 1. n° 1.) be a tangent to the circle Q S O, and an infinite right line P O R revolve about the center O, cutting the circle in S, and the tangent in P: then if upon the infinite bafe, or abfciffal line A K (ibid. n° 2.) be taken the point A, and afterwards, the abfcifs A B be taken upon the fame always equal to the circular arch Q S, and the correfpondent ordinate B C at right angles to it, be equal to the fecant O P of that arch, and moves along A K; by this motion the extremity C of that ordinate will defcribe the curve E D C called the figure of the fecants.

This curve confifts of an infinite number of fuch parts, of which E D C is one; having an infinite number of parallel afymptotes F G, H I, L K, drawn at diftances from one another, each equal to half the circumference of the circle Q S O, which parts alternately fall below and above the abfciffal line A K; the leaft ordinates being *a d*, or A D, each equal to the radius Q O of the circle. The quadrature of the fpace A D C B will give the meridional parts for a given latitude in Mercator's chart. See the article MERIDIONAL PARTS.

FIGURE *of the fines*, is generated much after the fame manner as the figure of the fecants,

ſecants, the difference being only that here every ordinate B C (ibid. n° 3.) anſwerable to the abſciſs A B, is the ſine of the correſpondent arch Q S of the circle (ſee the former figure) inſtead of being its ſecant, as O P. This curve conſiſts of an infinite number of parts, ſuch as A C G, alternately riſing above and falling below the abſciſſal line A I, which in reality make but one continued infinite ſerpentine line. Any ſpace A B C of this curve is ſquarable. See farther in Philoſ. Tranſ. n° 337.

FIGURE *of the tangents* is generated like the figure of the ſecants, with this difference, that the ordinate BC (ibid. no 4.) is here equal to the tangent Q P of the arch Q S, to which the abſciſs AB is equal; the curve conſiſting of an infinite number of ſuch parts, of which E A D is one, and having a like number of parallel aſymptotes at equal diſtances from each other.

FIGURE, in grammar, a deviation from the natural rules of etymology, ſyntax and proſody, either for brevity, elegance or harmony.

Figure in etymology, or figure of words, is generally called metaplaſmus. See the article METAPLASMUS.

Figures in ſyntax, or figures of ſentences, are reduced to four kinds, *viz.* Ellipſis, pleonaſmus, enallage, and hyperbaton; and the figures in proſody are theſe ſix, ſynalæpha, ecthlipſis, ſynæreſis, diæreſis, ſyſtole and diaſtole. See each of theſe under its proper head.

FIGURE, in heraldry, a bearing in a ſhield repreſenting a human face, as a ſun, a wind, an angel, &c.

FIGURE, in logic, denotes a certain order and diſpoſition of the middle term in any ſyllogiſm.

Figures are fourfold, 1. When the middle term is the ſubject of the major propoſition, and the predicate of the minor, we have what is called the firſt figure. 2. When the middle term is the predicate of both the premiſſes, the ſyllogiſm is ſaid to be in the ſecond figure. 3. If the middle term is the ſubject of the two premiſſes, the ſyllogiſm is in the third figure; and laſtly, by making it the predicate of the major, and ſubject of the minor, we obtain ſyllogiſms in the fourth figure. Each of theſe figures has a determinate number of moods, including all the poſſible ways in which propoſitions differing in quantity or quality can be combined, according to any diſpoſition of the middle term, in order to arrive at a juſt concluſion. See the article MOOD.

FIGURE, in painting and deſigning, denotes the lines and colours which form the repreſentation of any animal, but more particularly, of a human perſonage. Thus a painting is ſaid to be full of figures, when there are abundance of repreſentations of men; and a landſcape is ſaid to be without figures, when there is nothing but trees, plants, mountains, &c.

FIGURE, in rhetoric, is a manner of ſpeaking different from the ordinary and plain way, and more emphatical; expreſſing a paſſion, or containing a beauty.

Figures, therefore, are highly ſerviceable to clear difficult truths, to make a ſtyle pleaſant and pathetical, and to awaken and fix attention. But as, in order to obtain theſe ends, they are to be uſed with prudence and caution, the following directions ought to be obſerved. 1. Let the diſcourſe always be founded on nature and ſenſe, ſupported with ſtrong reaſon and proof, and then add the ornaments and heightenings of figures; for a man of clear underſtanding will deſpiſe the flouriſh of figures without ſenſe, and pomp of words that wants truth and ſubſtance of things. 2. Be ſparing in the uſe of figures. A paſſion deſcribed in a multitude of words, and carried on to a diſproportionate length, fails of the end propoſed, and tires inſtead of pleaſing. 3. Figures muſt not be over adorned, nor affectedly laboured, and ranged into new and ſcrupulous periods; for by affectation and ſhew of art, the orator betrays and expoſes himſelf, and it is apparent, that he is rather ambitious to ſet off his parts and wit, than to expreſs his ſincere concern and paſſion.

The principal and moſt moving figures are exclamation, doubting, correction, omiſſion, apoſtrophe, ſuſpenſion, prevention, conceſſion, repetition, periphraſis, exaggeration, climax, compariſon, proſopopœia, tranſition, ſentence, epiphonema, &c. See each of theſe under its proper head.

FIGURED, in general, ſomething marked with figures. See the article FIGURE.

The term figured is chiefly applied to ſtuffs, whereon the figures of flowers, and the like are either wrought, or ſtamped. See the articles STUFF, WEAVING, VELVET, &c.

FIGURED STONES, in natural hiſtory, thoſe

those found in the shape of shells, or other parts of animals. See STONE.

FILACER, or FILAZER. See FILAZER.

FILAMENT, in physiology and anatomy, denotes much the same as fibre. See the article FIBRE.

FILAMENTS, among botanists, is particularly used for the stamina. See STAMINA.

FILANDERS, in falconry, a disease in hawks, *&c.* consisting of filaments, or strings of blood, coagulated; and occasioned by a violent rupture of some vein, by which the blood, extravasating, hardens into these figures, and incommodes the reins, hips, *&c.*

FILANDERS are also worms as small as thread, and about an inch long, that lie wrapt up in a thin skin, or net, near the reins of an hawk, apart from either gut or gorge.

This malady is known by the hawk's poverty; by ruffling her tail; by her straining the fist, or perch, with her pounces; and lastly, by croaking in the night, when the filanders prick her. The disease proceeds from bad food, and must be remedied in time, to prevent its spreading over the whole body, and destroying the bird. These must not be killed as other worms are, for fear of imposthumes from their corruption, being incapable of passing away with the hawk's meat. They must only be stupified, to prevent their being offensive; and this is done by giving the hawk a clove of garlic, after which, she will feel nothing of the filanders for forty days. It will be prudent in the falconer when he observes the hawk poor and low, to give her a clove of garlic once a month by way of prevention.

FILAZER, or FILACER, an officer of the Common-Pleas, so called from his filing those writs whereon he makes out process.

There are fourteen of these officers, who are severally allotted to particular divisions and counties, and make out all writs and processes upon original writs, issuing out of the court of Chancery, and returnable in that court. They likewise make out all appearances and special bails, upon any process issued by them, and make the first fieri facias on special bails, writs of habeas corpus, supersedeas upon special bail; also writs of view in real actions, *&c.*

FILBERT, or FILBERD, the fruit of the corylus, or hazel, See CORYLUS.

This is the least sort of small nuts, and more nourishing than the common nuts; but it is hard to digest. They are however worthy of being propagated in orchards and gardens; which is done by sowing them in February.

In order to preserve them good, they should be kept in sand, in a moist cellar, where the vermin cannot come at them to destroy them: the external air should not be kept from them, for this would occasion their turning mouldy.

FILE, among mechanics, a tool used in metal, *&c.* in order to smooth, polish, or cut.

This instrument is of iron, or forged steel, cut in little furrows, with chissels, and a mallet, this and that way, and of this or that depth, according to the grain or touch required. After cutting the file, it must be tempered with a composition of chimney soot, very hard and dry, diluted, and wrought up with urine, vinegar, and salt; the whole being reduced to the consistence of mustard. Tempering the files consists in rubbing them over with this composition, and covering them in loam; after which they are put in a charcoal fire, and taken out by that time they have acquired a cherry colour, which is known by a small rod of the same steel put in along with them. Being taken out of the fire, they are thrown into cold spring water, and when cold, they are cleaned with charcoal and a rag; and being clean and dry, are kept from rust by laying them up in wheat bran. Iron files require more heating than steel ones. Files are of different forms, sizes, cuts and degrees of fineness, according to the different uses and occasions for which they are made. Those in common use are the square, flat, three square, half round, round, thin file, *&c.* each of which may be of different sizes, as well as different cuts.

The rough or coarse toothed files are to take off the unevenness of the work which the hammer made in the forging; and the fine-toothed files are to take out of the work the deep cuts or file-strokes of the rough files: the files succeed one another in this order, first the rubber, then the bastard toothed file, next the fine toothed file, and lastly, the smooth file. Thus the files of different cuts succeed one another, till the work is so smooth, as it can be filed. After which,

which, it may be made ftill fmoother, by emery, tripoli, *&c.* See POLISHING.

In ufing all forts of files, the rule is to lean heavy on the file in thrufting it forward, becaufe the teeth of the files are made to cut forward; but in drawing the file back again for a fecond ftroke, it is to be lightly lifted, juft above the work, by reafon it does not cut in coming back.

The file is ufed in pharmacy to reduce hard fubftances to fine particles, whofe confiftence will not admit of powdering. Files, the gros, containing twelve dozen, pay on importation 7s. $8\frac{40}{100}$d. and on exportation draw back 6s. 9d. Moreover, for every 112 ℔. of the iron, the duty is 4s. $8\frac{25}{100}$d. and on exportation the draw back is 4s. $8\frac{25}{100}$d.

FILE, or LABEL, in heraldry. See LABEL.

FILE, in the art of war, a row of foldiers, ftanding one behind another, which is the depth of the battalion, or fquadron. The files of a battalion of foot are generally three deep; as are fometimes thofe of a fquadron of horfe. The files muft be ftraight, and parallel one to another.

To double the FILES, is to put two files into one, which make the depth of the battalion double of what it was in number of men.

The FILE *leaders*, are the foremoft men in each file; the bringers up are the laft men of each file, or the laft rank of the battalion.

To FILE OFF, is the fame as to defile, or to file off from a large front to march in length. See the article DEFILE.

FILICULA, the DWARF-FERN. See the article FILIX.

FILIGRANE, or FILIGREE WORK, any piece of gold or filver-work, that is curioufly done, with grains or drops on the filaments or threads.

FILING, in fmithery, the operation of fafhioning metalline bodies by means of a file. See the article FILE.

FILIPENDULA, DROPWORT, a genus of the icofandria-pentagynia clafs of plants, the corolla of which confifts of five, or more, oblong, obtufe, plane, patent petals, inferted into the calyx: there is no pericarpium, except the crufts of the feed; the receptacle is globofe: the feeds are oblong, acuminated, and difpofed in a circular manner.

This plant is a diuretic: it is recommended againft colics, flatulencies, and the fluor albus: but its chief ufe confifts in ftopping too great a flow of the lochia.

FILIX, in botany, an order of the cryptogamia clafs of plants, comprehending the fern, horfe-tail, adder's tongue, maidenhair, fpleenwort, polypody, *&c.* See the articles FERN, *&c.*

FILLET, in anatomy, the fame with frænum. See the article FRÆNUM.

FILLET, or FILET, in architecture, a little fquare member, ornament, or moulding, ufed in divers places, and upon divers occafions, but generally as a crowning over a greater moulding.

FILLET, in heraldry, a kind of orle or bordure, containing only a third or fourth part of the breadth of the common bordure. It is fuppofed to be withdrawn inwards, and is of a different colour from the field. It runs quite round, near the edge, as a lace over a cloak. It is alfo ufed for an ordinary drawn like a bar, from the finifter point of the chief, acrofs the fhield, in manner of a fcarf; though it fometimes is alfo feen in the fituation of a bend, feffe, crofs, *&c.*

According to Guillim, the fillet is a fourth part of the chief, and is placed in the chief point of the efcutcheon.

FILLET, in painting, gilding, *&c.* is a little rule or reglet of leaf-gold, drawn over fome mouldings, or on the edges of frames, pannels, *&c.* efpecially when painted white, by way of enrichment.

FILLET, in the manege, the loins of an horfe, which begin at the place where the hinder part of the faddle refts.

FILLER-HORSE, one yoked immediately to a cart. See the article CART.

FILLY, a term among horfe-dealers, to denote the female or mare colt. See the article FOAL.

FILM, a thin fkin or pellicle. In plants, it is ufed for that thin, woody fkin, which feparates the feeds in the pods, and keeps them apart.

White FILM *upon the eye of a horfe*, may be removed by lifting up the eye-lid, after the eye has been wafhed with wine, and ftroaking it gently, with one's thumb, with wheat flour; alfo common falt, or falt of lead, beaten fine, and put into the eye, is proper to confume a film: or you may wafh the horfe's eye with your fpittle in the morning, fafting, having firft put a little falt into your mouth: but there is nothing fo effectual as fal armoniac, beaten and put into the eye, and repeated every day till the film is gone.

FILTER, or FILTRE, in chemiſtry, a ſtrainer commonly made of bibulous or filtering paper in the form of a funnel, through which any fluid is paſſed, in order to ſeparate the groſs particles from it, and render it limpid. See the article CLARIFICATION.

There are ſeveral filters made of flannel and linen-cloth.

FILTRATION, in chemſtry, a ſpecies of clarification. See CLARIFICATION.

FIMBRIÆ, denotes appendages diſpoſed by way of fringe round the border of any thing: ſuch are thoſe about the thicker extremities of the fallopian tubes. See the article FALLOPIAN.

FIMBRIATED, in heraldry, an ordinary with a narrow bordure or hem of another tincture.

This, in latin, is called *fimbriatus*, that is, edged or fringed.

FIN, *pinna*, in natural hiſtory, a well known part of fiſhes, conſiſting of a membrane ſupported by rays, or little bony or cartilaginous oſſicles.

The number, ſituation, and figure of fins, are different in different fiſhes. As to number, they are found from one to ten, or more; with reſpect to ſituation, they ſtand either on the back only, the belly only, or on both; and as to figure, they are either of a triangular, roundiſh, or oblong ſquare form. Add to this, that in ſome they are very ſmall; whereas, in others, they almoſt equal the whole body in length.

For the uſe of the fins in ſwimming,. See the article SWIMMING.

Whale-FINS. See the article WHALE.

FINAL, in general, whatever terminates or concludes a thing.

FINAL CAUSE. See the article CAUSE.

FINAL LETTERS, among hebrew grammarians, five letters ſo called, becauſe they have a different figure at the end of words from what they have in any other ſituation. Theſe are caph, mem, nun, phe, tzade, all comprehended in the word *camnephatz*; which, at the end of words, are written thus, ץףןםך; whereas, in any other ſituation, their form is thus, צפנמכ, on which account they are likewiſe called biform.

FINAL, in geography, a port town of Italy, ſubject to Genoa, and ſituated on the Mediterranean, about thirty-ſeven miles ſouth-weſt of that city.

FINANCES, in the french polity, ſignify the revenues of the king and ſtate.

FINCH-KIND, in ornithology, an appellation given to a genus of birds, known among authors by the name of fringilla, See the article FRINGILLA.

FINE, in law, has divers ſignifications, it being ſometimes taken for a ſum of money advanced and paid for the income of lands. It is likewiſe uſed in another ſenſe, where a ſum is paid as an amends, or by way of puniſhment for an offence committed.

Fine denotes alſo a covenant made before juſtices, and entered upon record, for conveyance of lands and other inheritable things, in order to cut off all controverſies. As this fine is a concord acknowledged before a competent judge concerning lands, tenements, and other immoveable things, and for its better credit, is ſuppoſed to be made in the preſence of the king, as it is levied in his court; it therefore binds women covert, who are parties, and others whom the law generally diſables to act; for this reaſon, becauſe all preſumption of deceit is excluded, where the king and his court of juſtice are deemed privy to the matter tranſacted. Fines, on account of their ſolemnity, are acknowledged in the court of common pleas. Juſtices of aſſiſe may alſo take them, though they ſeldom do it without a ſpecial dedimus poteſtatem, by virtue of which writ, fines may be alſo taken by commiſſioners in the country, and the dedimus ſurmiſes that parties are not able to travel to Weſtminſter; for by the common law, all fines are levied in court.

In every fine there are five parts, 1. An original writ, generally termed a writ of covenant. 2. The licentia concordandi, or the king's licence, for which a fine, called the king's ſilver, is paid. 3. The concord, which contains the agreement between the parties in what manner the land ſhall paſs, and is the foundation and ſubſtance of the fine. 4. The note of the fine, or abſtract of the original contract. 5. The foot of the fine containing the day, year and place, and before what juſtices the contract was made.

There are four ſorts of fines. 1. *A fine ſur cognizance de droit comme ceo*, &c. which is the principal and ſureſt kind of fine, as it gives poſſeſſion, at leaſt in law, to the cognizee, without any writ of execution. 2. *A fine ſur done, grant & render*, or double fine, whereby the cognizee, after a releaſe and warrant to him by

by the cognizor, grants and renders back the lands, *&c.* or ſome rent, many times limiting remainders. 3. *A fine ſur cognizance de droit tantum,* and this is a fine executory, that is commonly uſed to paſs a reverſion, and ſometimes by tenant for life to releaſe to the perſon in reverſion. 4. *A fine ſur conceſſit,* which is made uſe of to grant away eſtates for life or years, and it is alſo executory; ſo that the cognizee muſt enter or have a writ of habere facias poſſeſſionem, to obtain poſſeſſion.

Fines are either with proclamation, called fines according to the ſtatutes, or without proclamation, called fines at common law. The ſtatutes ordain, that every fine ſhall be openly read and proclaimed in the common pleas, and a tranſcript of it ſent to the juſtices of the aſſiſe, and another to the juſtices of the peace of the county where the land lies, in order to be proclaimed there; and when this is certified, privies in blood, as the heirs of the cognizor, are preſently barred, but ſtrangers to the fine have five years allowed them to enter and claim their right. The like time is given to infants, after they come to full age; to feme-coverts, not joining in fines after the death of their huſbands; to priſoners, after they are ſet at liberty; and to perſons out of the realm, after their return.

FINE ADNULLANDO LEVATO DE TENEMENTO QUOD FUIT DE ANTIQUO DOMINICO, is a writ directed to the common pleas to diſannul a fine levied of lands in antient demeſne, to the prejudice of the lord.

FINE *for alienation,* was a fine paid to the king by his tenants in chief, for a licence to alien their lands. Theſe fines are taken away by 12 Car. II. cap. 24.

FINE CAPIENDO PRO TERRIS, is a writ that lies where a perſon upon conviction of an offence by jury, having his lands and goods taken into the king's hands, and his body committed to priſon, obtains the favour to be remitted his impriſonment, and his lands and goods to be reſtored to him for a ſum of money.

FINE FORCE, is an expreſſion in the ſtatute 35 Henry VIII. c. 12. denoting that a perſon is forced to do that which he can no way avoid.

FINE NON CAPIENDO PRO PULCHRE PLACITANDO, is a writ to hinder officers of courts from taking fines for fair pleading.

FINE PRO REDISSEISINA CAPIENDA, is a writ which lies for the releaſe of a perſon impriſoned for a rediſſeiſin, upon paying a reaſonable fine.

FINES *for writs,* are paid in divers caſes for original writs. Thus for every writ of plea of land, if it be not of right patent, which is for the yearly value of five marks; and all original writs in debt and treſpaſs, where the debt or damage is 40 l. a fine is due to the king of 6 s. 8 d. and more proportionably when any writ is for things of greater value.

FINEERING, or VENEERING. See VENEERING.

FINERS *of gold and ſilver,* are thoſe who ſeparate theſe metals from coarſer ores.

FINERY, in the iron-works, one of the forges at which the iron is hammered and faſhioned into what they call a bloom, or ſquare bar. See the article IRON.

FINGERS, *digiti,* in anatomy, the extreme part of the hand divided into five members. See the article HAND.

The names of the fingers, reckoning from the thumb, are, 1. Pollex. 2. Index. 3. Medius. 4. Annularis. 5. Auricularis. In each of theſe there are three bones, which make three phalanges, the upper of which are much larger than the lower. Their exterior ſurface is gibbous or convex, and their interior is plane, but ſomewhat hollowed, for the convenience of ſeizing and laying hold of things. The firſt phalanx, in the part where they are articulated with the bones of the metacarpus at their heads, have a glenoide cavity, by means of which articulation, they have a free motion every way. In the other extremity, there are two heads with two cavities joined to the ſecond phalanx, where the motions of flexion and extenſion are all that are poſſible; and the ſame is the caſe between the ſecond phalanx and the third. In the upper extremities of the bones of the ſecond and third phalanx, there is to be obſerved an eminence placed between two cavities: this has the ſame uſe with the olecranum. The fartheſt extremity of the laſt phalanx, has a point or apex ſomewhat broader than the body. See the articles PHALANX and THUMB.

The muſcles of the fingers are in part common and in part proper. The common are the flexors of the firſt, ſecond, and third phalanx, the extenſor and interoſſei. See the articles EXTENSOR and INTEROSSEUS.

Of the proper muſcles of the fingers, thoſe belonging to the thumb are five, *viz.* flexor, extenſor, thenar, hypothenar,

nar, and antithenar. The proper muscles of the index and auricularis, are two in each, *viz.* an extensor and an abductor. See the articles FLEXOR, EXTENSOR, THENAR, &c.

Superfluous FINGERS. Infants are often born with superfluous, or supra-numerary fingers, which are usually misshapen and misplaced: some of these are found to have nails and bones like other fingers; others have nothing of this, but are mere masses of flesh. Heister is of opinion, that these should always be amputated in the infancy of the child, but if they are many in number, and the child but weakly, it may be better not to take them all off at one time, but to stay some time between each amputation, that one may be near well, before another is taken off. They are to be cut off with the scalpel or scissars, and the hæmorrhage stopped either with dry lint, or with the same dipped in spirit of wine, and afterwards healed, as common wounds, with vulnerary balsams.

Carious FINGERS. The fingers, when carious or affected by a spina ventosa, are, according to Heister, to be amputated three ways. 1. By a pair of strong scissars, or sharp edged pincers. 2. By a chizzel struck by a leaden mallet, by which they are separated at one blow: or lastly, by dividing the next sound joint with a scalpel, and drawing back a part of the skin to wrap over the stump, that it may heal the sooner; and this is the best method of all, as by this you are in no fear about any splinters of the bone being left.

Fractured FINGERS. When one or more of the bones in the fingers are broke, the surgeon's business is carefully to replace what has been removed, and to roll up the finger a little way with a narrow bandage, and then to bind it firmly to the next sound finger. But it is much more proper, when the finger is mashed, so as to give no hope of a good cure, to take it off at once. See FRACTURE.

Luxated FINGERS. The bones of the fingers and thumbs are liable to luxations of each of their articulations, and that in several directions; but these are accidents not only easily discovered, but very easily remedied also; for the ligaments being not very robust, the fat and muscles thin, and the sinuses of the articulations shallow, the extension is very easy, and the reduction of them into their former places not less so. The best method is to extend sufficiently the finger with one hand, and to replace the luxated bone at the same time with the other, and to retain it so by a proper bandage.

FINING, or REFINING. See the articles CLARIFICATION and REFINING.

FINING *of wines.* See the article WINE.

FINISHING, in architecture, is frequently used for a crowning, acroter, &c. raised over a piece of building, to terminate, complete, or finish it. See the article CROWNING.

FINISTERRA, the most westerly cape or promontory of Spain, in 10° 15′ west long. and 43° north lat.

This cape is likewise the most westerly part of the continent of Europe.

FINITE, something bounded or limited, in contradistinction to infinite. See the article INFINITE.

The schools distinguish finite into two kinds, *viz.* finite in perfection, and finite in extension. See PERFECTION and EXTENSION.

Finite in perfection, is applied to things which have not all possible perfection, but such only as may be comprehended by the mind. Thus the world, though supposed by the Cartesians infinite in point of extension, is yet finite in essence or perfection. In order to arrive at an idea of a thing finite in perfection, we must first conceive the thing as having certain perfections, and then conceive some other perfections which it has not; or some perfections in a greater degree. Thus when I say, that there is a finite number, I first conceive a number consisting of three units, then conceive other units beyond these three. I conceive my mind to be finite, by observing certain perfections beyond those I find in my mind.

Finite in extension, is applied to things which have not all possible or conceivable extension. To arrive at an idea of a thing finite in extension, we must first conceive the thing as having a certain extension, and then conceive some other extension which it has not; thus I conceive a room to be finite in extension, by having an idea of extension beyond what is contained therein.

FINITO, in music; a canon or fugue is said to be finito, when it is not perpetual, but when, at some certain place, all the parts join or unite, after having followed one another for some time.

FINITOR, in astronomy, the same with horizon, so called because it terminates the sight or prospect. See HORIZON.

FINLAND, a province of Sweden, lying northward of the gulph of Finland, and eaſtward of the Bothnic gulph. It is a frontier province, bounded by Ruſſia on the eaſt.

FINNIKIN, the engliſh name of a ſpecies of pigeon, remarkable for its wheeling round ſeveral times, whenever it courts the female.

FINNOCHIA, SWEET-FENNEL, in botany, a ſpecies of fennel, cultivated in gardens as a ſallad-herb, and as ſuch much liked by ſome.

FINTO, in muſic, a feint or an attempt to do ſomething and not to do it; as cadenza finto is, when having done every thing proper for a true cadence, inſtead of falling on the right final, another note, either higher or lower, is taken or perhaps a pauſe brought in.

FIR-TREE, *abies*, in botany. See the article ABIES.

Scotch FIR, a name given to the mountain-pine. See the article PINE.

FIRE, *ignis*, in phyſiology, according to Boerhaave, is ſomething unknown, which has the property of penetrating all ſolid and fluid bodies, and dilating them ſo as to take up more ſpace.

The moſt univerſal and ſenſible character of fire, and that which beſt diſtinguiſhes it from every other thing, is its giving heat: whence fire may be generally defined, to be whatever warms or heats bodies. However, by the general name of fire, men ſeem to underſtand a ſenſation or complex notion of light, heat, burning, melting, &c.

Nature of FIRE. The doctrine of fire, as laid down by modern philoſophers, is very different. The great and fundamental difference in reſpect to the nature of fire is, whether it be originally ſuch, formed thus by the creator himſelf at the beginning of things, or whether it be mechanically producible from other bodies, by inducing ſome alterations in the particles thereof. The former opinion is maintained by Homberg, Boerhaave, the younger Lemery, and s'Graveſande; the latter is chiefly ſupported by the engliſh philoſophers, lord Bacon, Mr. Boyle, and Sir Iſaac Newton.

Bacon, in his treatiſe De Forma Calidi, deduces from a great number of particulars, that heat in bodies is no other than motion; only a motion ſo and ſo circumſtantiated: ſo that to produce heat in a body, nothing is required but to excite a certain motion in the parts thereof. Boyle ſeconds him in an expreſs treatiſe of the mechanical origin of heat and cold, and maintains the ſame doctrine with new obſervations and experiments; as a ſpecimen whereof, we ſhall here give the two following.

1. In the production, ſays he, of heat, there appears nothing on the part either of the agent or patient, but motion and its natural effects. When a ſmith briſkly hammers a ſmall piece of iron, the metal thereby becomes exceedingly hot; yet there is nothing to make it ſo, except the forcible motion of the hammer impreſſing a vehement and variouſly determined agitation of the ſmall parts of the iron, which, being a cold body before, grows, by that ſuper-induced commotion of its ſmall parts, hot: firſt, in a more looſe acceptation of the word, with regard to ſome other bodies, compared with which it was cold before: then, ſenſibly hot; becauſe this agitation ſurpaſſes that of the points of our fingers; that in this inſtance oftentimes the hammer and anvil continue cold, after the operation: which ſhews that the heat acquired by the iron, was not communicated by either of thoſe implements, as heat; but produced in it by a motion, great enough ſtrongly to agitate the parts of ſo ſmall a body as the piece of iron, without being able to have the like effect upon ſo much greater maſſes of metal as the hammer and the anvil. Though if the percuſſions were often and briſkly renewed, and the hammer were ſmall, this alſo might be heated; whence it is not neceſſary, that a body itſelf be hot to give heat.

2. If a large nail be driven by a hammer into a plank of wood, it will receive ſeveral ſtrokes on its head, before it grow hot: but when it is once driven to the head, a few ſtrokes ſuffice to give it a conſiderable heat; for while, at every blow of the hammer, the nail enters further into the wood, the motion produced is chiefly progreſſive, and is of the whole nail tending one way; but when that motion ceaſes, the impulſe given by the ſtroke being unable to drive the nail further on, or break it, muſt be ſpent in making a various, vehement, and inteſtine commotion of the parts among themſelves, wherein the nature of heat conſiſts.

Agreeable to this is the opinion of Sir Iſaac Newton, who conceives that groſs bodies may be converted into light, by

the agitation of their particles; and light, again, into grofs bodies, by being fixed therein.

On the other hand, M. Homberg, in his Effai du Souffre Principe, holds that the chemical principle, or element fulphur, which is fuppofed one of the fimple, primary, pre-exiftent ingredients of all natural bodies, is real fire, and confequently that fire is coeval with bodies.

Dr. s'Gravefande goes on much the fame principle: fire, according to him, enters the compofition of all bodies, is contained in all bodies, and may be feparated or procured from all bodies, by rubbing them againft each other; and thus putting their fire in motion: but fire, he adds, is by no means generated by fuch motion.

Mr. Lemery, the younger, agrees with thefe two authors in afferting this abfolute and ingenerable nature of fire: but he extends it farther. Not contented to confine it as an element to bodies, he endeavours to fhew, that it is equally diffufed through all fpace, and that it is prefent in all places; in the void fpaces between bodies, as well as in the infenfible interftices between their parts.

This laft fentiment falls in with that of Boerhaave, and the celebrated M. Mufschenbroek. But notwithftanding it is evident that fire, heat, flame, *&c.* are only the different modifications of the particles of light, and that the particles of light themfelves depend entirely on velocity for their lucific quality; fince, by many experiments, we know, that the particles of bodies become lucid, or particles of light, by only producing in them a requifite degree of velocity: thus the particles in a rod of iron, being hammered very nimbly, fhine and become red hot: thus, alfo, the violent ftroke of the flint againft the fteel, in ftriking fire puts the particles of the fteel, which it takes off, in fuch a motion as caufes them to melt and become red hot, which makes the fparks of fire produced by each ftroke. As, therefore, fire confifts in the great velocity of the particles, fo it may be communicated from one body in which it is, to another in which it is not, after the fame manner that one body in motion will communicate motion to another that has got none.

Fire differs from heat only in this, that heat is a motion in the particles of a body, with a leffer degree of velocity; and fire a motion with a greater degree of velocity, *viz.* fuch as is fufficient to make the particles fhine; though we often call fuch a ftate as will burn, fire, though it does not actually fhine; and we feldom call thofe lucid bodies fires, which only fhine, and do not burn. Thefe are a fort of phofphori, which, though they have no heat, yet feem to owe their lucidity to the motion of their parts. See the articles HEAT and PHOSPHORUS.

There feems to be no other difference between fire and flame, than this; that fire confifts in a glowing degree of velocity in the parts of a body, while yet fubfifting together in the mafs; but flame is the fame degree of velocity in the particles diffipated and flying off in vapour: or, to ufe Sir Ifaac Newton's expreffion, flame is nothing elfe but a red hot vapour. See the article FLAME.

General divifion of FIRE. Fire, in general, is divided into three kinds or fpecies, *viz.* celeftial, fubterraneous, and culinary.

By celeftial fire we principally mean that of the fun, without regard to the fire of the fixed ftars, though this, perhaps, may be of the fame nature. By fubterraneous fire, we underftand that which manifefts itfelf in fiery eruptions of the earth, vulcanoes, or burning mountains; and by any other effects it produces in mines, or the more central parts of the earth. By culinary fire, we mean that commonly employed in all chemical operations in the animal, vegetable, atmofpherical, marine, and mineral kingdoms.

Confidered in itfelf, fire feems to exift in greateft purity and perfection in the celeftial regions; at leaft we are infenfible of any confiderable fmoke it yields; for the rays of light come to us from the fun unmixed with any of that grofs, feculent, or terreftrial matter found in culinary and fubterraneous fires. And allowing for this difference, the effects of the folar fire appear the fame as thofe of the culinary fire. To examine alfo the effects of fubterraneous fires, we fhall find them the fame with thofe produced by the culinary fire. And thus all the three kinds of fires agree in giving the motion of rarefaction to bodies. All fubterraneous and culinary fires require fome pabulum or fuel, wherein it refides, or is collected; but whether the fame is required for the fubfiftence of the celeftial fire, is more than we know. See the article FUEL.

Sir Ifaac Newton is of opinion, that the fire of the fun and fixed ftars, is conferved

ed by the greatneſs of theſe bodies, and the mutual action and re-action between them and the light which they emit; that their parts are kept from fuming away, not only by their fixity, but by the vaſt weight and denſity of the atmoſpheres incumbent upon them, and very ſtrongly compreſſing them, and condenſing the vapours and exhalations which ariſe from them.

Effects and properties of Fire. So great is the power, ſo extenſive the action, and ſo wonderful the manner wherein fire acts, that it was antiently held and adored as the ſupreme god, by a nation reputed the wiſeſt of all others. Thus ſome of the chemiſts, having found its extraordinary force, took it for an uncreated being; and many of the moſt eminent among them, attributing all the knowledge they had acquired to this inſtrument, called themſelves philoſophers of fire, as thinking they could not be dignified by a higher title.

Fire, in effect, is the univerſal inſtrument of all the motion and action in the univerſe: without fire, all bodies would become immoveable; whence fire is the univerſal cauſe of all motion or change.

The effects of fire in burning, conſiſts in this, that the velocity of the particles of fire ſo far increaſes the velocity of the parts of the body to which it is applied, as to cauſe a ſeparation beyond the ſphere of corpuſcular attraction; by which means the body will be diſſolved, and the particles, which are volatile, will fly off in the form of ſteam, ſmoke, fume, &c. while that which remains appears in the form of coal, calx, aſhes, caput mortuum, &c.

The parts of ſome bodies are extremely volatile, and will moſt of them be diſſipated by the action of fire: but others, again, are to be found whoſe parts are of ſuch a nature, or ſo fixed, as not to yield to the force of fire, or the velocity communicated to them will not be able to diſſolve the corpuſcular attraction; but when this glowing velocity of the parts is abated, or, in other words, when the fire in the body is extinct, the parts, and, of courſe, the whole body, appear unaltered; of which ſort of ſubſtance we have a notable inſtance in thoſe foſſils called the aſbeſtus and amianthus. See Asbestus and Amianthus.

All the phyſical knowledge we can have of a ſubject, muſt ariſe from attending to its properties and effects: but theſe properties and effects can never be diſcovered without the help of experiments, which in phyſical enquiries are the only interpreters betwixt the ſenſes and the reaſon: whence all thoſe notions of fire ſhould be taken as precarious, that are taken from the teſtimony of the ſenſes, or the naked reaſon unaſſiſted by experiments.

We frequently find the effects of fire produced where no viſible fire appeared. Thus the fingers are eaſily burnt by an iron heated below the degree of ignition, or ſo as to be no way viſibly red; whence we find, that the eye is no judge of fire: ſo likewiſe the touch gives us no poſitive notice of any degree of fire below the natural heat of the body, or any ſo great as to deſtroy the organ. Again, the effects of fire are often produced without any manifeſt ſigns of burning, melting, &c. as in evaporations, exſiccations, &c. If this method of excluſion and rejection were purſued to its due length, we ſhould find perhaps no criterion, infallible mark, or characteriſtic of fire in general, but that of a particular motion ſtruggling among the ſmall parts of bodies, and tending to throw them off at the ſurface. And if this ſhould prove the caſe, then ſuch a motion will be the form or eſſence of fire; and which being preſent, makes fire alſo preſent; and when abſent, makes fire alſo abſent: whence to produce fire and produce this motion in bodies, will be the ſelf-ſame thing.

But from repeated experiments we learn, 1. That, in general, both ſolids and fluids manifeſt an expanſive motion upon being heated. 2. That the direct inflammable matter of fuel, is oil, or an unctuous ſubſtance. 3. That no fuel will burn or conſume, without the admiſſion of freſh air. 4. That the air which has once paſſed through burning fuel, is, of itſelf, unfit to animate fire again. And, 5. That flame exiſts only on the ſurface of fuel.

It appears a property belonging to fire, that its parts endeavour equally to diffuſe themſelves; that is, by moving every way, and conſequently tend neither more nor leſs to one point than another. If fire be collected in any body ſo as to be perceivable by our ſenſes, it removes itſelf out of the ſame by its own power, and expands every way from the center of its ſpace or body; whence we learn the proper conatus of fire, and that the receſſion of it is ſpontaneous. From this laſt

last property of fire, may be computed its force and quantity: for the state of fire, as defined above, may be called its stagnation; and the powers of stagnating fire will then be as the spaces wherein it is contained; consequently the communication of powers will be to each other as the spaces.

It were to be wished that the proportional quantity of fire contained in a body, could be determined; but this is not so easy as at first sight it may seem, by reason, that though from the discovered effects of fire we may estimate its power, we cannot estimate its quantity; as the augmentation of the fire, arising from the nearness of its particles, is hitherto undetermined: for so long as the proportion of the power of fire depending on its density or closeness, to that depending on the quantity thereof is unknown, so long we shall be unable to argue from the effect of fire to the quantity thereof.

Yet fire, whilst it thus remains in a heated body, says Boerhaave, does not seem to unite with it into one corporeal concrete mass; since, though greater than before, it is not found heavier. Neither does fire diminish any thing of the weight which the body would have had at that time, and to which cold should restore it. Nothing of this kind appears from any experiment yet made.

It may be observed, that the same fire as applied in different quantities, first compounds bodies; and when raised to a higher pitch, decompounds them again. One and the same fire applied to the same body, with different circumstances, will have quite different effects, and especially as the air happens to be variously admitted during the operation; and the same fire, as applied in different degrees to the same object, has very different effects, as is found by experiments.

Fire and flame are abolished or extinguished by suffocation, or an action contrary to ventilation, as being destructive or preventive of that internal commotion and discharge of the oily particles of fuel, by means of the free air, wherein the nature of open and consuming fire consists. And hence fire and flame are quenched by water, or even by spirit of wine, or oil of turpentine, if a live coal or lighted candle be suddenly plunged therein below the surface of the liquor. For the degree of heat which water, spirit of wine, or oil of turpentine unfired, are capable of receiving, is much less than that of a burning coal or candle: whence the greater heat is subdued by the less, as fire quenched by boiling water.

FIRE, in chemistry, the great instrument by which most of the operations in that art are performed.

The kind, degree, direction, *&c.* of fire, are things the chemist is principally to attend to. There are, in chemistry, as many kinds of fire, as there are mediums through which it may be conveyed, or fuels that afford it. For common use, fire is conveyed through ashes, sand, water, *&c.* or directly through the containing vessel. Hence, fires are denominated of various kinds, as those of sand, filings of iron, and ashes, the reverberatory fire, the ignis rotæ, or fire for fusion, the lamp fire, the balneum mariæ, the vapour bath, and the fire of suppression. The chemists also use several other kinds of heats, which may be classed among the fires, such as insolation, a bath of horse-dung, a bath of the skins of grapes, and the heat of quick-lime.

For the balneum arenosum, or the fires or baths of sand, filings of iron, and ashes, balneum mariæ, balneum vaporis, or vapour-bath, see BALNEUM.

The reverberatory fire is made in a furnace covered with a dome, that by this means the heat or flame, which has always a tendency to make its escape at the superior parts of the furnace, may be reverberated, or beat back on the vessel immediately exposed to it. To expose a vessel to a naked fire, or to distil with a naked fire, is when there is no intermediate substance between the distilling vessel and the fire.

The ignis rotæ, or fire for fusion, is when a crucible or any other vessel containing the matter destined for fusion, is surrounded with live-coals.

Lamp-fire, is when any matter contained in a glass vessel is rendered hot by the equable heat of a lighted lamp.

Fire of suppression, is when in order to distil per descensum, the fire is laid above the matter, so that the moisture forced from it, by means of the heat, is precipitated to the bottom of the vessel: or when the body of the retort, or other vessel, is covered over with fire.

Insolation, is when any matter designed either to be put into fermentation or dried, is exposed to the heat of the sun.

The bath of horse-dung, called also the horse's belly, is when a vessel containing any matter to be either digested or distilled,

tilled, is placed in a large heap of horfe-dung.

Bath of the fkins of grapes, like the bath of horfe's dung, ferves for digeftions or diftillations; the fkins are to be collected after the vintage.

The heat of quick-lime moiftened, may ferve for fome diftillations.

Some differences may be found in the effects produced by thefe different fires, applied in the fame degree. But they have not, perhaps, been noted as they deferve. In feveral bodies, it is evident that dry and moift heats have different effects, which we may find remarkably in the common culinary operations of boiling, roafting, baking, &c. And hence, when the fame effects are required perfectly fimilar, the fame kinds as well as degrees of fire are to be ufed.

The pureft fire is that of alcohol, or perfectly pure fpirit of wine; the next in purity is that of diftilled oils; the next, that of charcoal, or charred turf; and the impureft, pit-coal: but all thefe have nearly the fame effect, when received through the fame kind of medium.

Degrees of FIRE. The laft thing to be confidered is, how to regulate and afcertain the degrees of fire in chemical operations, fo as to produce the effects required in every cafe. The common directions of chemifts about this matter are full of uncertainty; the firft, fecond, third, and fourth degrees of heat, or fire, meaning no precife degrees, meafured by any ftandard: however, according to Boerhaave, they are as follows.

The firft degree of fire is that by which nature performs the office of vegetation in plants, and whereby chemiftry imitates or does the like: this commences from the higheft degree of cold, which, in Fahrenheit's thermometer, is denoted by one, and ends at 80 degrees: fince in this whole interval we find certain plants give indications of life and growth. This heat is fuited to extracting of the native fpirits of odoriferous vegetables with oils, as that of rofes, jeffamin, &c. and again, to making the more curious infolations, &c.

The fecond degree of fire may be accounted that of the human body, in a healthy ftate. This degree is always greater than that of the ambient air, and may be fuppofed to commence at the 40th degree of the thermometer, and end about the 94th. Within this compafs animals may live and fubfift, that is, if their juices be of any degree of heat within thefe bounds. This degree is adapted to vinous and acetous fermentation, putrefaction, exclufion of the chick, the finer digeftions, the making of tinctures and elixirs; and the adepts have ufed it for the firft digeftion of their mercury, by carrying the including veffel conftantly in their pocket.

The third degree of fire is that which extends from 94 degrees of the thermometer to 212, at which laft water ufually boils. This degree is required in the diftillation of fimple and compound waters, the effential oils of vegetables, and will coagulate or confolidate the ferum, blood, and other animal juices, and confequently deftroy the creatures.

The fourth degree may be taken from 211 to 600 of the thermometer, within which latitude quickfilver or oil of vitriol boils, diftils, or becomes volatile. This degree is fuited to the melting of lead, tin, bifmuth, &c. and the fubliming of fal armoniac and fulphur, the calcining of antimony, &c.

The fifth degree is that wherein the other metals melt, and which commences from 600 degrees of the thermometer, and ends where iron is held in a ftate of fufion. In this degree moft bodies are deftroyed; but glafs, gold, filver, copper, and iron remain long unchanged; all other fixed bodies grow red-hot in this degree, and all the unvitrifible ftones are calcined.

The fixth and higheft degree of fire, hitherto known is that of the burning lens or concave, by M. Villette, Tfchirnhaufen, Buffon, and others. The focus of thefe lenfes will even volatilize what is called the metalline or mercurial part of gold, and vitrify the more terreftrial. See the article BURNING-GLASS.

The fires of fand, filings of iron, and afhes, have generally their degrees from the firft to the third: the reverberatory fire has its degrees from the firft to the fourth: the ignis rotæ ferves for calcinations and fufions; and a veffel may receive different degrees of heat from a lighted lamp: the balneum mariæ and balneum vaporis have alfo their degrees, as has the fire of fuppreffion its degrees: Infolation has its degrees in proportion to the heat of the fun, to which the fubftances are expofed: the bath of horfe's dung has its degrees, according to the bulk of the heap, or the place in which it is lodged: the bath of grape-fkins has alfo its degrees, like that of the bath of horfe's dung: and the heat of quick-lime

has

has alfo its degrees; for according as we defire it more or lefs ftrong, we expofe it in powder longer or fhorter to the open air; and when we have occafion for all its heat, we ufe it as quick as we poffibly can.

Extinguifhing of FIRES. The world has long been of an opinion, that a more ready way, than that in general ufe, might be found for extinguifhing fires in buildings; and it has been generally attempted upon the doctrine of explofion. Zachary Greyl was the firft perfon who put this plan into execution with any tolerable degree of fuccefs. He contrived certain engines, eafily manageable, which he proved before fome perfons of the firft rank, to be of fufficient efficacy, and offered to difcover the fecret by which they were contrived for a large premium, given either from the crown, or raifed by a fubfcription of private perfons. But this fcheme meeting with no better fuccefs than things of this nature ufually do, he died without making the difcovery. Two years after this, the perfon, who had his papers, found the method, and it was fhewn before the king of Poland and a great concourfe of nobility at Drefden, and the fecret purchafed at a very confiderable price. After this, the fame perfon carried the invention to Paris and many other places, and practifed it every where with fuccefs. The fecret was this: A wooden veffel was provided holding a very confiderable quantity of water: in the center of this was fixed a cafe made of iron plates, and filled with gun-powder; from this veffel, to the head of the larger veffel containing the water, there was conveyed a tube or pipe, which might convey the fire very readily through the water to the gun-powder contained in the inner veffel. This tube was filled with a preparation eafily taking fire, and quickly burning away; and the manner of ufing the thing was, to convey it into the room or building where the fire was, with the powder in the tube lighted. The confequence of this was, that the powder in the inner cafe foon took fire, and with a great explofion burft the veffel to pieces, and difperfed the water every way; thus was the fire put out in an inftant, though the room was flaming before in all parts at once. The advantage of this invention was, that, at a fmall expence, and with the help of a few people, a fire in its beginning might be extinguifhed; but the thing was not fo general as it was at firft expected that it would prove, for though of certain efficacy in a chamber or clofe building, where a fire had but newly begun, yet when the mifchief has increafed fo far that the houfe was fallen in, or the top open, the machine had no effect. This was the thing firft difcovered by Greyl, and from which our chemift Godfrey took the hint of the machine, which he called the water-bomb, and would fain have brought into ufe in England.

FIRE, in medicine. See CAUSTICS.

FIRE, in furgery. See CAUTERY.

St. Anthony's FIRE, in medicine. See the article ERYSIPELAS.

Walking FIRE, in meteorology. See the article WILL-WITH-A-WISP.

FIRE, in theology. See the articles HELL, CONFLAGRATION, *&c.*

We read of the facred fire in the firft temple of Jerufalem, concerning which the Jews have a tradition that it came down from heaven: it was kept with the utmoft care, and it was forbidden to carry any ftrange fire into the temple. This fire is one of the five things which the Jews confefs were wanting in the fecond temple.

The pagans had their facred fires, which they kept in their temples with the moft religious care, and which were never to be extinguifhed. Numa was the firft who built a temple to fire, as a goddefs, at Rome, and inftituted an order of prieftefles for the prefervation of it. See the article VESTALS.

Fire was the fupreme god of the Chaldæans; the magi were worfhippers of fire; and the Greeks and Armenians ftill keep up a ceremony called the Holy Fire, upon a perfuafion that every eafter-day a miraculous fire defcends from heaven into the holy fepulchre, and kindles all the candles and lamps there. On this occafion the church of the holy fepulchre is crowded by a numerous and diftracted mob, who make a folemn proceffion with ftandards, crucifixes, *&c.* after which the people light their candles at the facred flame, and immediately apply it to their beards, faces, and bofoms, pretending that it will not burn like an earthly flame: they alfo think that if they are buried in a fhroud fmutted with this celeftial fire, it will fecure them from the flames of hell.

FIRE, in the art of war, a word of command to the foldiers, to dichrge their mufquets; to the cavalry, to difcharge their carabines or piftols; to the grena-

diers, to fire their grenadoes; and to the gunners, to fire the guns.

Running FIRE is when a rank of men, drawn up, fire one after another: or, when the lines of an army are drawn out to fire on account of a victory, each squadron or battalion takes it from another, from the right of the first line to the left, and from the left to the right of the second line.

FIRE-ARMS are all sorts of arms charged with powder and ball, as cannon, musquets, carabines, pistoles, blunderbusses, *&c.* See CANNON, GUN, *&c.*

FIRE-BALL, in the art of war, a composition of meal-powder, sulphur, salt-petre, pitch, *&c.* about the bigness of a hand-grenade, coated over with flax, and primed with a slow composition of a fusee. This is to be thrown into the enemy's works in the night time, to discover where they are: or to fire houses, galleries, or blinds of the besiegers; but they are then armed with spikes or hooks of iron, that they may not roll off, but stick or hang where they are designed to have any effect.

FIRE LOCK. See GUN, MUSQUET, *&c.*

FIRE-MASTER, in our train of artillery, an officer, who gives the directions and proportions of ingredients for each composition required in fire-works, whether for the service of war, or for rejoicings and recreations.

His orders are given to the fire-workers and bombardiers, who must execute them.

FIRE-POTS, in the military art, small earthen pots, into which is put a charged grenade, and over that powder enough till the grenade is covered; then the pot is covered with a piece of parchment, and two pieces of match across lighted: this pot being thrown by a handle of match, where it is designed, it breaks and fires the powder, and burns all that is near it, and likewise fires the powder in the grenade, which ought to have no fuse, to the end its operations may be the quicker.

FIRE-WORKERS, officers subordinate to the fire-master.

FIRE-WORKS. See PYROTECHNY.

FIRE-SHIP, in the navy, a vessel charged with artificial fire-works, which, having the wind of an enemy's ship, grapples her, and sets her on fire.

FIRE-BARE, in our old customs, signifies a beacon, or tower, by the sea-side, wherein there were kept continual lights.

FIRE-BOTE is fuel or firing for necessary use, allowed to tenants, out of the lands granted to them.

FIRE-COCKS. Churchwardens in London and within the bills of mortality, are to fix fire-cocks at proper distances in streets, and keep a large engine and hand-engine for extinguishing fire, under the penalty of 10l. stat. 6 Annæ, cap. xxxi.

On the breaking out of any fire in London and Westminster, the constables and beadles of parishes shall repair to the place with their staves, and assist in extinguishing it, and cause the people to work for that end, *&c.*

FIRE-OFFICE, an office of insurance from fire. See the article ASSURANCE.

FIRE ENGINE. See the article ENGINE.

Wild-FIRE, a kind of artificial or factitious fire, which burns even under water, and that with greater violence than out of it. It is composed of sulphur, naphtha, pitch, gum, and bitumen; and is only extinguishable by vinegar mixed with sand and urine, or by covering it with raw hides. Its motion or tendency is said to be contrary to that of natural fire, and it always follows the direction in which it is thrown, whether it be downwards, sideways, or otherwise.

Several are of opinion that the antient Greeks and Romans used this fire in their engagements at sea: whether or not that was the case, it was applied against the Saracens in a sea fight, commanded by Constantine Pogonates, in the Helespont, and with such effect that he burnt the whole fleet therewith, wherein there were thirty thousand men.

Electrical FIRE. See ELECTRICITY.

FIRING-IRON, in farriery, an instrument not unlike the blade of a knife; which being made red-hot, is applied to a horse's hams, or other places standing in need of it, as in preternatural swellings, farcy knots, *&c.* in order to discuss them. Sometimes this is done for wrenches of the pasterns.

FIRKIN, an English measure of capacity, for things liquid, being the fourth part of the barrel: it contains 8 gallons of ale, soap, or herrings; and 9 gallons of beer. See MEASURE and BARREL.

FIRLOT, a dry measure used in Scotland. The oat-firlot contains 21¼ pints of that country; the wheat-firlot contains about 2211 cubical inches; and the barley-firlot, 31 standard pints. Hence it appears that the scotch wheat-firlot exceeds the english bushel by 33 cubical inches. See the article MEASURE.

FIRMA-

FIRMAMENT, in the ptolemaic aftronomy, the eighth heaven or fphere, with refpect to the feven fpheres of the planets which it furrounds. It is fuppofed to have two motions; a diurnal motion, given to it by the primum mobile, from eaft to weft about the poles of the ecliptic; and another oppofite motion from weft to eaft, which laft it finifhes, according to Tycho, in 25412 years, according to Ptolemy in 36000, and according to Copernicus in 25800, in which time the fixed ftars return to the fame points in which they were at the beginning. This period is commonly called the Platonic year, or the great year.

FIRMAMENT is alfo ufed in divers places of fcripture, to denote the middle region of the air. Several of the antients have believed, with the modern philofophers, that the firmament is a fluid matter; but certainly thofe who gave it the name of firmament, thought it a folid matter.

FIRMAN is a paffport or permit granted by the great mogul to foreign veffels, to trade within the territories of his jurifdiction.

FIRMNESS, *firmitas*, denotes the confiftence of a body, or that ftate wherein its fenfible parts cohere in fuch a manner, that the motion of one part induces a motion of the reft.

Many of the cartefians maintain, that firmnefs confifts in the mere reft of the particles of a body, and their mutual immediate contact, alledging that a feparation of parts can only arife from fome matter interpofed between them, which matter is excluded by the notion of contiguity. But the infufficiency of this hypothefis is obvious; and the firmnefs of all bodies is known to depend on the connection or cohefion of their particles. See ATTRACTION, COHESION, &c.

FIRST-FRUITS, *primitiæ*, among the Hebrews, were oblations of part of the fruit of the harveft, offered to God as an acknowledgment of his fovereign dominion. The firft of thefe fruits was offered in the name of the whole nation, being either two loaves of bread, or a fheaf of barley which was threfhed in the court of the temple. Every private perfon was alfo obliged to bring his firft-fruits to the temple, and thefe confifted of wheat, barley, grapes, figs, apricots, olives, and dates.

There was another fort of firft-fruits which were paid to God. When bread was kneaded in a family, a portion of it was fet apart, and given to the prieft or levite who dwelt in the place: if there was no prieft or levite there, it was caft into the oven, and confumed by the fire. Thefe offerings made a confiderable part of the revenues of the hebrew priefthood. Firft-fruits are frequently mentioned in antient chriftian writers as one part of the church revenue. One of the councils of Carthage enjoins that they fhould confift only of grapes and corn, which fhews that this was the practice of the african church.

FIRST-FRUITS, in the church of England, are the profits of every fpiritual benefice for the firft year, according to the valuation thereof in the king's books. See the article ANNATES.

FIRST MOVER, *primum mobile*. See the article PRIMUM MOBILE.

FISC, *fifcus*, in the civil law, the treafury, of a prince. It differs from the ærarium, which was the treafury of the public or people: thus, when the money arifing from the fale of condemned perfons goods, was appropriated for the ufe of the public, their goods were faid *publicari*; but when it was deftined for the fupport of the prince, they were called *confifcari*.

FISCAL, in the civil law, fomething relating to the pecuniary intereft of the prince or people. The officers appointed for the management of the fifc, were called *procuratores fifci*, and *advocati fifci*; and among the cafes enumerated in the conftitutions of the empire, where it was their bufinefs to plead, one is againft thofe who have been condemned to pay a fine to the fifc on account of their litigioufnefs, or frivolous appeals.

FISH, in natural hiftory, conftitutes a clafs of animals which have no feet, but always fins; add to this, that their body is either altogether naked, or only covered with fcales; and that they are aquatic animals, which live moftly, if not always, in water.

This clafs is fubdivided by authors into five feries, or orders.

1. The plagiuri or cetaceous fifhes, comprehending thofe who have the tail not perpendicular, like all other fifhes, but placed in an horizontal direction, or parallel to the horizon. 2. Chondropterygious fifhes, comprehending thofe with perpendicular tails, and the rays of the fins not bony, but cartilaginous. 3. Branchioftegious fifhes, or thofe which have perpendicular tails, the rays of the fins bony, and the branchiæ or gills not officulated.

offiſculated. 4. Acanthopterygious fiſhes, or thoſe with perpendicular tails, and the rays of the fins bony, and prickly at the ends. 5. Malacopterygious fiſhes, or ſuch as have perpendicular tails, with the rays bony, but not prickly at their ends. See PLAGIURI, *&c.* and plate of ichthyology, where a fiſh of each ſeries is delineated, in the ſame order as above.

Some diſtinguiſh fiſhes, from the place where they are found, into ſea-fiſh, river-fiſh, and lake or pond-fiſh. Others again divide them into cetaceous, cartilaginous, and ſpinoſe. The cetaceous, or whale-kind, called *belluæ marinæ*, have lungs, and breathe like quadrupeds; they copulate alſo like them, and conceive and bring forth their young alive, whom they ſuckle with their milk. The cartilaginous kind are produced from large eggs, like birds, which are excluded the womb alſo like thoſe of birds. The ſpinoſe kind are alſo oviparous, but their eggs are ſmaller, and have ſpines up and down in their fleſh, to ſtrengthen it.

Willoughby thinks it would be better to diſtinguiſh fiſhes, firſt, into the cetaceous kind, or thoſe that breathe with lungs; and thoſe that breathe with gills: then to ſubdivide thoſe that breathe with gills, not into cartilaginous and ſpinoſe, but into oviparous and viviparous; with other the like ſubdiviſions. But the diviſion firſt laid down, is that followed by the beſt ichthyologiſts, Artedi, Linnæus, and others.

As to the ſtructure of fiſhes, it is admirably adapted to the element in which they live: their fins, tail, gills, air-bladder, eyes, figure, *&c.* are all ſuch as beſt ſuit their circumſtances; for the deſcription and uſes of which, ſee the articles FIN, TAIL, *&c.*

FISH, in commerce. The exporter, on making oath that they were britiſh taken, and really exported, is entitled to the following bounties, to be paid by the collector of the ſalt-duty, at the port of exportation, within thirty days after demand, upon a debenture prepared by the collector of the cuſtoms, *viz.*

		s.	d.
Pilchards, or ſcads, the caſk, containing 50 gallons,		7	0
Cod, Ling, or Hake	if 14 inches or upwards in length from the bone in the fin to the 3d joint in the tail, the 100	5	6
	wet, the barrel, containing 32 gallons,	2	0
	dried, the hundred wt,	3	0

	s.	d.
Salmon, the barrel, containing 42 gallons — — —	4	6
White herrings, the barrel, containing 32 gallons, —	2	8
Full red herrings, the barrel as above — — —	1	9
Clean ſhotten red herrings the barrel as above, — —	1	0
Dried red ſprats, the laſt	1	0

Fiſh of all ſorts, taken by foreigners and imported in foreign ſhips, are forfeited, together with the ſhip, except ſtock-fiſh, live eels, ſturgeon, botargo or cavear, and anchovies. And, by 1 Geo. I. cap. xviii. ſalmon taken in great rivers, and ſea-fiſh ſold, are to be of certain lengths, or the takers ſhall forfeit 5 l. and the ſellers 20 s. beſides the fiſh.

Generation of FISHES. See the article GENERATION.

Breeding of FISHES may be turned to great advantage; for beſides furniſhing your table, obliging your friends, and raiſing money, your land will be thereby greatly improved, ſo as yield more this way than by any other employment whatever.

When fiſh are fed in large pools or ponds, either malt boiled, or freſh grains, is the beſt food; thus carps may be raiſed and fed like capons, and tenches will feed as well. The care of feeding them is beſt committed to a gardener, or the butler, who ſhould be always at hand. In a ſtew, any ſort of grain boiled, eſpecially peas, and malt coarſe ground; alſo the grains after brewing, whilſt freſh and ſweet: but one buſhel of malt not brewed, will go as far as two of grains. See the article FISH-PONDS, *infra.*

FISH, in a ſhip, a plank or piece of timber, faſtened to a ſhip's maſt or yard, to ſtrengthen it, which is done by nailing it on with iron-ſpikes, and woulding or winding ropes hard about them.

FISHES, in heraldry, are the emblems of ſilence, and watchfulneſs, and are borne either upright, imbowed, extended, endorſed reſpecting each other, ſurmounting one another, fretted, *&c.*

In blazoning fiſhes, thoſe borne feeding, ſhould be termed devouring; all fiſhes borne upright and having fins, ſhould be blazoned hauriant; and thoſe borne tranſverſe the eſcutcheon, muſt be termed naiant.

FISH-BLOCK, in a ſhip. See BLOCK.

FISH-GARTH, a wear or dam in a river, for catching of fiſh. See WEAR.

FISH-SHELLS, in huſbandry. See SHELL-

FISH-PONDS, thofe made for the breeding or feeding of fifh.

Fifh-ponds are no fmall improvement of watery and boggy lands, many of which are fit for no other ufe. In making of a pond, its head fhould be at the loweft part of the ground, that the trench of the flood-gate or fluice, having a good fall, may not be too long in emptying. The beft way of making the head fecure, is to drive in two or three rows of ftakes above fix feet long, at about four feet diftance from each other, the whole length of the pond-head, whereof the firft row fhould be rammed at leaft about four feet deep. If the bottom is falfe, the foundation may be laid with quick-lime, which flacking, will make it as hard as a ftone. Some lay a layer of lime, and another of earth dug out of the pond, among the piles and ftakes; and when thefe are well covered, drive in others, as they fee occafion, ramming in the earth as before, till the pond-head be of the height defigned.

The dam fhould be made floping on each fide, leaving a wafte to carry off the overabundance of water in times of floods or rains; and as to the depth of the pond, the deepeft part need not exceed fix feet, rifing gradually in fhoals towards the fides, for the fifh to fun themfelves, and lay their fpawn. Gravelly and fandy bottoms, efpecially the latter, are beft for breeding; and a fat foil with a white fat water, as the wafhings of hills, commons, ftreets, finks, &c. is beft for fattening all forts of fifh. For ftoring a pond, carp is to be preferred for its goodnefs, quick growth, and great increafe, as breeding five or fix times a year. A pond of an acre, if it be a feeding and not breeding one, will every year feed two hundred carps of three years old, three hundred of two years old, and four hundred of a year old. Carps delight in ponds that have marl or clay-bottoms, with plenty of weeds and grafs, whereon they feed in hot months.

Your pond fhould be drained every three or four years, and your fifh forted. If it is a breeding one, the fmaller ones are to be taken out, to ftore other ponds with; leaving a good ftock of females, at leaft eight or nine years old, as they never breed before that age. In feeding ponds, it is beft to keep them pretty near of a fize.

FISHERY, a place where great numbers of fifh are caught.

The principal fifheries for falmon, herring, mackrel, pilchards, &c. are along the coafts of England, Scotland, and Ireland; for cod on the banks of Newfoundland; for whales, about Greenland; and for pearls, in the Eaft and Weft Indies.

FISHERY denotes alfo the commerce of fifh, more particularly the catching them for fale.

Were we to enter into a very minute and particular confideration of fifheries, as at prefent eftablifhed in this kingdom, this article would fwell beyond its proper bounds; becaufe to do juftice to a fubject of that concernment to the britifh nation, requires a very ample and diftinct difcuffion. We fhall, however, obferve, that fince the divine providence has fo eminently ftored the coafts of Great Britain and Ireland with the moft valuable fifh; and fince fifheries, if fuccefsful, become permanent nurferies for breeding expert feamen; it is not only a duty we owe to the fupreme being, not to defpife the wonderful plenty he hath afforded us, by neglecting to extend this branch of commerce to the utmoft; but it is a duty we owe to our country, for its natural fecurity, which depends upon the ftrength of our royal navy. No nation can have a navy, where there is not a fund of bufinefs to breed and employ feamen, without any expence to the public, and no trade is fo well calculated for training up thefe ufeful members of this fociety, as fifheries.

The fituation of the britifh coafts is the moft advantageous for catching fifh in the world; the fcottifh iflands, particularly thofe to the north and weft, lie moft commodious for carrying on the fifhing trade to perfection; for no country in Europe can pretend to come up to Scotland in the abundance of the fineft fifh, with which its various creeks, bays, rivers, lakes, and coafts are replenifhed. King Charles I. was fo fenfible of the great advantage to be derived from fifheries, that he began the experiment, together with a company of merchants; but the civil war foon occafioned that project to be fet afide. King Charles II. made a like attempt, but his preffing wants made him withdraw what money he had employed that way, whereupon the merchants that joined with him, did fo too. Since the union, feveral attempts have been made to retrieve the fifheries, and a corporation fettled to that effect, intitled the Royal Britifh fifhery.

In the year 1750, the parliament of Great

Britain taking the ſtate of the fiſheries into conſideration, an act was paſſed for the encouragement of the white-herring fiſhery, granting a charter, whereby a corporation is created, to continue twenty-one years, by the name of the Society of the Free Britiſh Fiſhery, to be under the direction of a governor, preſident, vice-preſident, council, *&c.* who are to continue in office the ſpace of three years, with power to make bye-laws, *&c.* and to raiſe a capital of 500,000 l. by way of ſubſcription. And any number of perſons, who, in any part of Great Britain, ſhall ſubſcribe 10,000 l. into the ſtock of this ſociety, under the name of the Fiſhing Chamber, and carry on the ſaid fiſhery on their own account of profit and loſs, ſhall be intitled to the ſame bounty allowed to the ſociety. The bounty is 30 s. the tun, to be paid yearly, for fourteen years, beſides 3 *per cent.* for the money advanced by each chamber. The act contains other proper regulations relative to the nets, marks on the herring-barrels, number of hands, and the quantity of ſalt that is intitled to the bounty, *&c.* It is then by the encouragement given by this act, that we now ſee a laudable emulation prevailing all over the two kingdoms, and fiſhing buſſes fitted out from almoſt every port, in order to repair to the Shetland iſlands, where the herring-fiſhery is carried on with an ardor becoming ſo important a branch of trade. Scotland, which ſuffered incredibly from the neglect of this valuable and natural produce of the ſeas, has not been backward to join in a ſcheme that tends ſo evidently to its own advantage; for the cities of Edinburgh and Glaſgow, the towns of Montroſe, Dundee, Perth, Inverneſs, and ſome other boroughs, have raiſed the proper ſum, and chambers have been erected in each of them; the gentlemen of eſtates adjoining to the reſpective places above-mentioned, liberally contributing with merchants, towards the proſecution of an undertaking ſo viſibly tending to the good of their country in general.

Anchovy-FISHERY. Anchovies are fiſhed on the coaſt of Provence, in the months of May, June, and July, at which ſeaſon ſhoals of this fiſh regularly come into the Mediterranean through the ſtreights of Gibraltar. They are likewiſe found in plenty in the river of Genoa, on the coaſt of Sicily, and on that of the iſland of Gorgone oppoſite to Leghorn; theſe laſt are reckoned the beſt. It is remarkable, that anchovies are ſeldom fiſhed but in the night-time. If a fire be kindled on the poops of the veſſels uſed for this fiſhing, the anchovies will come in greater numbers into the nets; but then it is aſſerted, that the anchovies taken thus by fire, are neither ſo good nor ſo firm, and will not keep ſo well, as thoſe which are taken without fire. When the fiſhery is over, they pull off the heads of all the anchovies, gut them, and afterwards range them in barrels of different weights, the largeſt of which do not weigh above 25 or 26 pounds, and they put a good deal of ſalt in them. Some alſo pickle them in ſmall earthen pots made on purpoſe, of two or three pounds weight more or leſs, which they cover with plaſter, to keep them the better.

Cod FISHERY. There are two kinds of cod-fiſh, the one green or white cod, and the other dried or cured cod, tho' it is all the ſame fiſh differently prepared; the former being ſometimes ſalted and barrelled, then taken out for uſe; and the latter having lain ſome competent time in ſalt, dried in the ſun or ſmoke. We ſhall therefore ſpeak of each of theſe apart, and firſt of

Green cod-FISHERY. The chief fiſheries for green cod are in the Bay of Canada, on the great bank of Newfoundland, and on the iſle of St. Peter, and the iſle of Sable, to which places veſſels reſort from divers parts both of Europe and America. They are from 100 to 150 tuns burden, and will catch between 30 and 40 thouſand cod each. The moſt eſſential part of the fiſhery, is to have a maſter who knows how to cut up the cod, one who is ſkilled to take the head off properly, and above all, a good ſalter, on which the preſerving them, and conſequently the ſucceſs of the voyage, depends. The beſt ſeaſon is from the beginning of February to the end of April; the fiſh which in the winter retire to the deepeſt water, coming then on the banks, and fattening extremely. What is caught from March to June keeps well, but thoſe taken in July, Auguſt, and September, when it is warm on the banks, are apt to ſpoil ſoon. Every fiſher takes but one at a time: the moſt expert will take from 350 to 400 in a day, but that is the moſt, the weight of the fiſh and the great coldneſs on the bank fatiguing very much. As ſoon as the cod are taken, the head is taken off; they are opened, gutted and ſalted, and the ſalter ſtows them

them in the bottom of the hold, head to tail, in beds a fathom or two ſquare; laying layers of ſalt and fiſh alternately, but never mixing fiſh caught on different days. When they have lain thus three or four days to drain off the water, they are replaced in another part of the ſhip, and ſalted again; where they remain till the veſſel is loaded. Sometimes they are cut in thick pieces, and put up in barrels for the conveniency of carriage.

Dry cod FISHERY. The principal fiſhery for dry cod, is from Cape Roſe to the Bay des Exports, along the coaſt of Placentia, in which compaſs there are divers commodious ports for the fiſh to be dried in. Theſe, though of the ſame kind with the freſh cod, are much ſmaller, and therefore fitter to keep, as the ſalt penetrates more eaſily into them. The fiſhery of both is much alike, only this latter is more expenſive, as it takes up more time, and employs more hands, and yet ſcarce half ſo much ſalt is ſpent in this as in the other. The bait is herrings, of which great quantities are taken on the coaſt of Placentia. When ſeveral veſſels meet and intend to fiſh in the ſame port, he whoſe ſhalloop firſt touches ground, becomes intitled to the quality and privileges of admiral: he has the choice of his ſtation, and the refuſal of all the wood on the coaſt at his arrival. As faſt as the maſters arrive, they unrig all their veſſels, leaving nothing but the ſhrouds to ſuſtain the maſts, and in the mean time the mates provide a tent on ſhore, covered with branches of trees, and ſails over them, with a ſcaffold of great trunks of pines, twelve, fifteen, ſixteen, and often twenty feet high, commonly from forty to ſixty feet long, and about one third as much in breadth. While the ſcaffold is preparing, the crew are fiſhing, and as faſt as they catch they bring their fiſh aſhore; open and ſalt them upon moveable benches; but the main ſalting is performed on the ſcaffold. When the fiſh have taken ſalt, they waſh and hang them to drain on rails; when drained, they are laid on kinds of ſtages, which are ſmall pieces of wood laid acroſs, and covered, with branches of trees, having the leaves ſtripped off, for the paſſage of the air. On theſe ſtages, they are diſpoſed, a fiſh thick, head againſt tail, with the back uppermoſt, and are turned carefully, four times every twenty-four hours. When they begin to dry, they are laid in heaps ten or twelve thick, in order to retain their warmth; and every day the heaps are enlarged, till they become double their firſt bulk; then two heaps are joined together, which they turn every day as before; laſtly, they are ſalted again, beginning with thoſe firſt ſalted, and being laid in huge piles, they remain in that ſituation, till they are carried on board the ſhips, where they are laid on the branches of trees diſpoſed for that purpoſe, upon the ballaſt, and round the ſhip, with mats to prevent their contracting any moiſture.

There are four kinds of commodities drawn from cod, *viz.* the zounds, the tongues, the roes, and the oil extracted from the liver. The firſt is ſalted at the fiſhery, together with the fiſh, and put up in barrels from 6 to 700 pound. The tongues are done in like manner, and brought in barrels from 4 to 500 pounds. The roes are alſo ſalted in barrels, and ſerve to caſt into the ſea to draw fiſh together, and particularly pilchards. The oil comes in barrels, from 400 to 520 pounds, and is uſed in dreſſing leather. The Scots catch a ſmall kind of cod on the coaſt of Buchan, and all along the Murray Firth on both ſides; as alſo in the Firth of Forth, Clyde, &c. which is much eſteemed. They ſalt and dry them in the ſun upon rocks, and ſometimes in the chimney. They alſo cure ſkait, and other ſmaller fiſh in the ſame manner, but moſt of theſe are for home-conſumption.

Coral-FISHERY. See CORAL-*Fiſhery*.

Herring-FISHERY. Herrings are chiefly found in the north-ſea. They are a fiſh of paſſage, and commonly go in ſhoals, being very fond of following fire or light, and in their paſſage they reſemble a kind of lightning. About the beginning of June, an incredible ſhoal of herrings, probably much larger than the land of Great-Britain and Ireland, come from the north on the ſurface of the ſea: their approach is known by the hovering of ſea fowl in expectation of prey, and by the ſmoothneſs of the water; but where they breed, or what particular place they come from, cannot be eaſily diſcovered. As this great ſhoal paſſes between the ſhores of Greenland and the north cape, it is probably confined, and as it reaches the extremities of Great Britain, is neceſſarily divided into two parts. For we find one part of the herrings, ſteering weſt, or ſouth-weſt, and leaving the iſlands of Shetland and Orkney

ney to the left, pass on towards Ireland, where being interrupted a second time, some keeping the shore of Britain, pass away south down St. George's channel; while the other part edging off to the south-west, coast the western ocean, till they reach the south shore of Ireland, and then steering south-east, join the rest in St. George's channel. The other part of the first division made in the north, parting a little to the east and south-east, pass by Shetland, and then make the point of Buchan-ness, and the coast of Aberdeen, filling as they go, all the bays, firths, creeks, &c. with their innumerable multitudes. Hence they proceed forward, pass by Dunbar, and rounding the high shores of St. Abbe's Head, and Berwick, are seen again off Scarborough; and even then not diminished in bulk, till they come to Yarmouth-Roads, and from thence to the mouth of of the Thames, after which, passing down the British channel, they seem to be lost in the western ocean.

The vast advantage of this fishery to our nation is very obvious, when we consider that though herrings are found upon the shores of North America, they are never seen there in such quantities as with us, and that they are not to be met with in considerable numbers in any of the southern kingdoms of Europe as Spain, Portugal, or the south parts of France on the side of the ocean, or in the Mediterranean, or on the coast of Africa. There are two seasons for fishing herring, the first from June to the end of August, and the second in autumn, when the fogs become very favourable for this kind of fishing. The Dutch begin their herring-fishing on the 24th of June, and employ no less than two thousand vessels therein called busses, being between forty-five and sixty tuns burden, and carrying three or four small cannon. They never stir out of port without a convoy, unless there be enough together to make about eighteen or twenty cannon among them, in which case they are allowed to go in company. Before they go out, they make a verbal agreement, which has the same force as if it were in writing. The regulations of the admiralty of Holland are partly followed by the French, and other nations, and partly improved and augmented with new ones, as, that no fisher shall cast his net within a hundred fathoms of another boat: that while the nets are cast, a light shall be kept on the hind part of the vessel: that when a boat is by any accident obliged to leave off fishing, the light shall be cast into the sea: that when the greater part of a fleet leaves off fishing, and casts anchor, the rest shall do the same, &c. By the late act of parliament in Great-Britain, the regulations are, that every vessel intitled to the bounty, must carry twelve Winchester bushels of salt in new barrels, for every last of fish such vessel is capable of holding; and as many more new barrels as such vessels can carry; and two fleets of tanned nets, that is, a vessel of seventy tons shall carry one fleet of fifty nets, each net to be thirty yards full upon its rope, and seven fathoms deep; and so in proportion for greater or smaller vessels; and be provided with one other fleet of fifty like nets, on board a tender, or left on shore in a proper place for the use of the said vessel, &c.

There is nothing particular in the manner of fishing. The nets wherein the fish are drawn, should regularly have their meshes an inch square to let all the lesser fry go through.

Curing and preparing Herring. The commerce of herring both white or pickled, and red, is very considerable. The white Dutch herrings are the most esteemed, being distinguished into four sorts, according to their sizes; and the best are those that are fat, fleshy, firm, and white, salted the same day they are taken, with good salt and well barrelled. The british herrings are little inferior, if not equal to the Dutch, for in spite of all their endeavours to conceal the secret, their method of curing, lasting, or casking the herrings, has been discovered, and is as follows. After they have hawled in their nets, which they drag in the sterns of their vessels backwards and forwards in traversing the coast, they throw them upon the ship's deck, which is cleared of every thing for that purpose; the crew is separated into sundry divisions, and each division has a peculiar task: one part opens and guts the herrings, leaving the melts and roes: another cures and salts them, by lining or rubbing their inside with salt: the next packs them, and between each row and division they sprinkle handfuls of salt: lastly, the cooper puts the finishing hand to all by heading the casks very tight, and stowing them in the hold. It is customary with us to wash the herring in fresh water, and steep them

them twelve or fifteen hours, in a ſtrong brine, before we proceed to barrel them.

Red Herrings muſt lie twenty-four hours in the brine, in as much as they are to take all their ſalt there, and when they are taken out, they are ſpitted, that is, ſtrung by the head on little wooden ſpits, and then hung in a chimney made for that purpoſe. After which, a fire of bruſh-wood which yields a deal of ſmoke, but no flame, being made under them, they remain there till ſufficiently ſmoked and dried, and are afterwards barrelled up for keeping.

Mackrel-Fishery. The mackrel are found in large ſhoals in the ocean, but eſpecially on the french and engliſh coaſts. They enter the engliſh channel in April, and proceeding as the ſummer advances; about June, they are on the coaſts of Cornwal, Suſſex, Normandy, Picardy, *&c.* where the fiſhery is moſt conſiderable. They are taken either with a line or nets: the latter is preferable, and is uſually performed in the night time. They are pickled two ways, firſt by opening and gutting them, and cramming their bellies as hard as poſſible with ſalt, by means of a ſtick, and then laying them in rows at the bottom of the veſſel, ſtrewing ſalt between each layer. The ſecond way is putting them directly into tubs full of brine, made of ſalt and freſh water, and leaving them to ſteep till they have taken ſalt enough to keep. After this, they are barrelled up and preſſed cloſe down.

Pearl-Fishery. See Pearl Fishery.

Pilchard-Fishery. The chief pilchard fiſheries are along the coaſts of Dalmatia, on the coaſt of Bretagne, and along the coaſts of Cornwal and Devonſhire. That of Dalmatia is very plentiful: that on the coaſts of Bretagne employs annually about 300 ſhips. The pilchards caught on our coaſts, though bigger, are not ſo much valued as thoſe on the coaſts of France, owing principally to their not being ſo thoroughly cured. They naturally follow the light, which contributes much to the facility of the fiſhery: the ſeaſon is from June to September. On the coaſts of France they make uſe of the roes of the cod-fiſh, as a bait, which thrown into the ſea, makes them riſe from the bottom, and run into the nets: On our coaſts there are perſons poſted aſhore, who ſpying by the colour of the water where the ſhoals are, make ſigns to the boats to go among them to caſt their nets. When taken, they are brought on ſhore to a warehouſe, where they are laid up in broad piles, ſupported with backs and ſides, and as they are piled, they ſalt them with bay ſalt, in which lying to ſoak twenty or thirty days, they run out a deal of blood, with dirty pickle and bittern: then they waſh them clean in ſea water, and when dry, barrel and preſs them hard down to ſqueeze out the oil, which iſſues out at a hole in the bottom of the caſk. The corniſh men obſerve of the pilchard, that it is the leaſt fiſh in ſize, moſt in number, and greateſt for gain, of any they take out of the ſea.

Salmon-Fishery. The chief ſalmon fiſheries in Europe are in England, Scotland, and Ireland, in the rivers, and ſea-coaſts adjoining to the river mouths. Thoſe moſt diſtinguiſhed for ſalmon in Scotland, are the River Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Neſs, the Bewley, *&c.* in moſt of which it is very common about the height of ſummer, eſpecially if the weather happen to be very hot, to catch four or five ſcore of ſalmon at a draught. The chief rivers in England for ſalmon are the Tyne, the Trent, the Severn, and the Thames. The fiſhing uſually begins about January, and in Scotland, they are obliged to give over about the 15th of Auguſt, becauſe, as it is then ſuppoſed the fiſh come up to ſpawn, it would be quite depopulating the rivers to continue fiſhing any longer. It is performed with nets, and ſometimes with a kind of locks or wears made on purpoſe, which in certain places have iron or wooden grates ſo diſpoſed, in an angle, that being impelled by any force in a contrary direction to the courſe of the river, they may give way and open a little at the point of contact, and immediately ſhut again, cloſing the angle. The ſalmon, therefore, coming up into the rivers, are admitted into theſe grates, which open, and ſuffer them to paſs through, but ſhut again, and prevent their return. Salmon are alſo caught with a ſpear, which they dart into him when they ſee him ſwimming near the ſurface of the water. It is cuſtomary likewiſe to catch them with a candle and lanthorn, or wiſp of ſtraw ſet on fire; for the fiſh naturally following the light, are ſtruck with the ſpear, or taken in a net ſpread for that purpoſe, and lifted with a ſudden jerk from the bottom. We make no mention

mention of the method of catching ſalmon with a line or hook, becauſe it is much the ſame with that explained under the article *Trout* FISHING.

Curing Salmon. When the ſalmon are taken, they open them along the back, take out the guts and gills, and cut out the greateſt part of the bones, endeavouring to make the inſide as ſmooth as poſſible, then ſalt the fiſh in large tubs for the purpoſe, where they lie a conſiderable time ſoaking in brine, and about October, they are packed cloſe up in barrels, and ſent to London, or exported up the Mediterranean. They have alſo in Scotland, a great deal of ſalmon ſalted in the common way, which after ſoaking in brine a competent time, is well preſſed, and then dried in ſmoke: this is called kipper, and is chiefly made for home-conſumption, and if properly cured and prepared, is reckoned very delicious.

Sturgeon-FISHERY. The greateſt ſturgeon-fiſhery is in the mouth of the Volga, on the Caſpian Sea, where the Muſcovites employ a great number of hands, and catch them in a kind of incloſure formed by huge ſtakes, repreſenting the letter Z, repeated ſeveral times. Theſe fiſheries are open on the ſide next the ſea, and cloſe on the other, by which means the fiſh aſcending in its ſeaſon up the river, is embarraſſed in theſe narrow angular retreats, and ſo is eaſily killed with a harping-iron. Sturgeons, when freſh, eat deliciouſly, and in order to make them keep, they are ſalted or pickled in large pieces, and put up in cags from thirty to fifty pounds. But the great object of this fiſhery is the roe, of which the Muſcovites are extremely fond, and of which is made the cavear or kavia, ſo much eſteemed by the Italians. See the article CAVEAR.

Whale FISHERY. Whales are chiefly caught in the north ſea: the largeſt ſort are found about Greenland, or Spitzbergen. At the firſt diſcovery of this country, whales not being uſed to be diſturbed, frequently came into the very bays, and were accordingly killed almoſt cloſe to the ſhore, ſo that the blubber being cut off was immediately boiled into oil on the ſpot. The ſhips in thoſe times, took in nothing but the pure oil and the fins, and all the buſineſs was executed in the country, by which means a ſhip could bring home the product of many more whales than ſhe can according to the preſent method of conducting this trade. The fiſhery alſo was then ſo plentiful, that they were obliged ſometimes to ſend other ſhips to fetch off the oil they had made, the quantity being more than the fiſhing ſhips could bring away. But time and change of circumſtances have ſhifted the ſituation of this trade. The ſhips coming in ſuch numbers from Holland, Denmark, Hamburgh, and other northern countries, all intruders upon the Engliſh, who were the firſt diſcoverers of Greenland, the whales diſturbed, and gradually, as other fiſh often do, forſaking the place, were not to be killed ſo near the ſhore as before, but are now found, and have been ſo ever ſince, in the openings and ſpaces among the ice, where they have deep water, and where they go ſometimes a great many leagues from the ſhore.

The whale-fiſhery begins in May, and continues all June and July; but whether the ſhips have good or bad ſucceſs, they muſt come away and get clear of the ice by the end of Auguſt; ſo that in the month of September at fartheſt, they may be expected home; but a ſhip that meets with a fortunate and early fiſhery in May, may return in June or July.

The manner of taking whales at preſent is as follows. As ſoon as the fiſhermen hear the whale blow, they cry out *fall! fall!* and every ſhip gets out its long boat, in each of which there are ſix or ſeven men: they row till they come pretty near the whale, then the harpooner ſtrikes it with the harpoon. This requires great dexterity, for through the bone of his head there is no ſtriking, but near his ſpout there is a ſoft piece of fleſh, into which the iron ſinks with eaſe. As ſoon as he is ſtruck, they take care to give him rope enough, otherwiſe, when he goes down, as he frequently does, he would inevitably ſink the boat: this rope he draws with ſuch violence, that, if it were not well watered, it would by its friction againſt the ſides of the boat, be ſoon ſet on fire. The line faſtened to the harpoon is ſix or ſeven fathoms long, and is called the fore-runner: it is made of the fineſt and ſofteſt hemp, that it may ſlip the eaſier: to this they join a heap of lines of 90 or 100 fathoms each, and when there are not enough in one long boat, they borrow from another. The man at the helm obſerves which way the rope goes, and ſteers the boat accordingly, that it may run exactly out before; for

for the whale runs away with the line with so much rapidity, that he would overset the boat, if it were not kept straight. When the whale is stuck, the other long boats row before, and observe which way the line stands, and sometimes pull it; if they feel it stiff, it is a sign the whale still pulls in strength; but if it hangs loose, and the boat lies equally high before and behind upon the water, they pull it in gently, but take care to coil it so, that the whale may have it again easily if he recovers strength: they take care, however, not to give him too much line, because he sometimes entangles it about a rock, and pulls out the harpoon. The fat whales do not sink as soon as dead, but the lean ones do, and come up some days afterwards. As long as they see whales, they lose no time in cutting up what they have taken, but keep fishing for others: when they see no more, or have taken enough, they begin with taking off the fat and whiskers in the following manner. The whale being lashed along side, they lay it on one side, and put two ropes, one at the head, and the other in the place of the tail, which together with the fins is struck off, as soon as he is taken, to keep those extremities above water. On the off side of the whale are two boats to receive the pieces of fat, utensils and men that might otherwise fall into the water on that side. These precautions being taken, three or four men with irons at their feet, to prevent slipping, get on the whale, and begin to cut out pieces of about three feet thick, and eight long, which are hauled up at the capstane or windlass. When the fat is all got off, they cut off the whiskers of the upper jaw with an ax. Before they cut, they are all lashed to keep them firm, which also facilitates the cutting, and prevents them from falling into the sea; when on board, five or six of them are bundled together, and properly stowed, and after all is got off, the carcass is turned adrift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the rest of the crew are employed in slicing them smaller, and picking out all the lean. When this is prepared, they stow it under the deck, where it lies till the fat of all the whales is on board; then cutting it still smaller, they put it up in tubs in the hold, cramming them very full and close. Nothing now remains but to sail homewards, where the fat is to be boiled and melted down into train oil.

It were in vain to speak in this place of the advantages that may be derived to Great Britain from the whale fishery. We shall only remark, that the legislature thinks that trade of so great importance, as to grant a very considerable bounty for the encouragement of it; for every british vessel of 200 tons or upwards, bound to the Greenland-seas on the whale-fishery, if found to be duly qualified according to the act, obtains a licence from the commissioners of the customs to proceed on such voyage: and on the ship's return, the master and mate making oath that they proceeded on such voyage and no other, and used all their endeavours to take whales, *&c.* and that all the whale-fins, blubber, oil, *&c.* imported to their ship, were taken by their crew in those seas, there shall be allowed 40 s. for every ton according to the admeasurement of the ship.

Besides these fisheries, there are several others both on the coasts of Great Britain and in the north seas, which although not much the subject of merchandize, nevertheless employ great numbers both of ships and men; as 1. The oyster fishing at Colchester, Feversham, the Isle of Wight, in the Swales of the Medway, and in all the creeks between Southampton, and Chichester, from whence they are carried to be fed in pits about Wevenhoe, and other places. See the article OYSTER.

2. The lobster fishing all along the british channel, the firth of Edinburgh, on the coast of Northumberland, and on the coast of Norway, from whence great quantities are brought to London. And lastly, the fishing of the pot-fish, fin-fish, sea-unicorn, sea-horse, and the seal, or dog fish, all which are found in the same seas with the whales, and yield blubber in a certain degree; besides, the horn of the unicorn is as estimable as ivory, and the skins of the seals are particularly useful to trunk makers.

FISHING, in general, the art of catching fish, whether by means of nets, or of spears, lines, rods, and hooks. See the article NET, LINE, ROD, *&c.*

By several statutes it is provided, that no persons shall fish in any pond or moat, without the owner's consent, on pain of three months imprisonment, nor shall

any one take fiſh in a river without licence obtained from the owner, upon forfeiture of 10 s. to the poor, and triple damages to the party aggrieved, to be levied by juſtices of the peace, by diſtreſs and ſale of goods. The nets, and other implements, belonging to poachers, may be ſeized by the owners of rivers, &c.

Fiſhing performed with a rod, line, and hook, is called angling. See ANGLING.

Carp-FISHING requires a world of patience, by reaſon they ſeldom bite in cold weather, and, in hot, the angler cannot be too early, or too late; but when they do bite, there is no fear of the hold. The baits proper for them, are the red worms in March, the cadew in June, and the graſs-hopper in July, Auguſt, and September. See CARP and BAIT.

Chub-FISHING is performed with a large bait, whether worm, ſnail, fly, cheeſe, &c. according to the ſeaſon and time of the day; but the large yellow moth ſeems to be a favourite morſel of this fiſh. See the article CHUB.

Cod FISHING. See FISHERY, *ſupra*.

Dace-FISHING affords good ſport, as they catch at any fly, particularly the ſtone-cadew, and may-fly, in the beginning of ſummer, and the ant-fly in June, July, Auguſt, &c. But to catch dace in winter, the bait is a white worm, with a large red head, found in ploughed lands. See the article DACE.

Eel-FISHING. The ſilver-eel may be catched with ſeveral ſorts of baits, as powdered beef, garden-worms, lobs, minnows, garbage, &c. The night is the beſt time for this kind of fiſhing; throwing a line with good ſtore of hooks, baited and well plumbed, into the places where eels reſort, with a float to diſcover where the lines lie, that they may be taken up in the morning.

As to the method called bobbing and ſniggling, it is only by means of a ſtick thruſting a baited hook into the holes where eels uſe to hide themſelves. Some fiſh for eels with a three-forked ſpear jagged on the ſides: this they ſtrike into the mud, and if it chance to light where they lie, there is no fear of ſecuring them. But to take the largeſt eels of all, the night hooks are to be baited with ſmall roaches, and the hooks muſt lie in the mouth of the fiſh. See the article EEL.

Flounder-FISHING, in the months of April, May, June, and July, may be performed all day long, either in the ſtream, or ſtill deep-water, but the ſtream is beſt; and the moſt proper baits are all ſorts of red-worms, waſps, or gentles. See the article FLOUNDER.

Gudgeon FISHING may be performed with float, the hook being on the ground; or by hand, with a running line on the ground, without cork or float. A ſmall red worm is the beſt bait for this fiſh, yet waſps, gentles, and cad-bits, will do very well; and, in order to gather them to the place, it may not be improper to ſtir the ſand and gravel, above and below it, by which means they will bite faſter, and with more eagerneſs. See the article GUDGEON.

Herring FISHING. See the articles FISHERY, *ſupra*, and HERRING.

Mackrel-FISHING. See the article FISHERY, *ſupra*, and MACKREL.

Pearch-FISHING. The proper baits are a minnow, or little frog; but the beſt of all is a worm called a brandling. You may alſo angle for this fiſh with job worms, bobs, waſps, &c. If you row for a pearch with a minnow, which of all baits yields the beſt ſport to the angler, it muſt be alive, ſticking the hook through the upper lip, or back-fin, letting it ſwim about midwater, or ſomewhat lower; for which end you ought to have an indifferent large hook, with a quill on your line; but ſome, with good ſucceſs, have uſed a ſtrong ſilk-line, and a hook armed with wire. If you fiſh with a frog, the hook muſt be faſtened through the ſkin of the leg, toward the upper part thereof.

Pike-FISHING is performed two ways, 1. By the ledger-bait, fixed in one certain place; which muſt be a living bait of fiſh or frog, as dace, roach, pearch, and yellow frogs. 2. By the walking bait, with a troll and winch, ſo as to give the fiſh length enough to run off with the bait, then ſtriking him with a ſmart jerk. The rod muſt not be too ſlender at top; and the line ſhould be of ſilk two yards and a quarter next the hook, and ſtrongly armed with a wire about ſeven inches.

Pilchard-FISHING. See FISHERY, *ſupra*, and PILCHARD.

Roach-FISHING is beſt performed, in April, with cads or worms; and, in ſummer, with white ſmall ſnails, or flies; but then the baits ſhould be under water, for they will not bite at top. Some uſe a may-fly with good ſucceſs; and, in autumn, a paſte, made of the crumb of fine bread, will do very well. The man-

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ner of fiſhing for roach at London is peculiar. They take a ſtrong cord, at the end of which is faſtened a three pound weight; and a foot above the lead, a pack-thread of twelve feet is made faſt to the cord; and to the pack-thread, at proper diſtances, they add twelve ſtrong links of hair, with roach hooks at them, baited with a white ſnail or periwinkle. Then holding the cord in their hands, the biting of the fiſh draws the pack-thread, and that the cord, which gives them notice what to do. By this means, they ſometimes draw up half a dozen, and very commonly two or three at a draught.

Salmon FISHING. See the articles FISHERY and SALMON.

Sturgeon FISHING. See the article FISHERY and STURGEON.

Tench-FISHING, is beſt performed with large red worms, at which they will bite the more eagerly, if dipped in tar. Several other ſorts of worms, and a paſte made of brown bread, are alſo uſed for this purpoſe.

Trout-FISHING. The baits for this purpoſe are either natural or artificial, as earth worms, minnows, and fiſhing flies, both natural and artificial. Whatever worms are uſed, they anſwer beſt if kept ſome time in an earthen pot, with moſs often changed in ſummer. If you fiſh for trout with hand on the ground, the hook is to be introduced into the worm a little above the middle, coming out again a little below; then draw the worm above the arming of the hook, making your firſt entrance at the tail-end, that the point of the hook may come out at the head-end. When you fiſh with minnows, take the whiteſt and middle-ſized; and after putting the hook in at the mouth, and out at the gills, and drawing it thro' about three inches, ſlip it again into his mouth, ſo as the point and beard may come out at the tail. This done, tie the hook and tail together with a fine white-thread, and let the body of the minnow be almoſt ſtraight upon the hook.

FISSURE *of the bones*, in ſurgery, is when they are divided either tranſverſely or longitudinally, not quite through, but cracked after the manner of glaſs, by any external force. Fiſſures are not eaſily detected, ſince neither the ſenſes of ſeeing, feeling, or hearing can give light enough to determine any thing with certainty in this caſe. However, ſurgeons always ſuppoſe there is a fiſſure when there happens violent inflammations, ſuppurations, fiſtulæ, and caries, with exceſſive pain, after any external violence. When, from theſe ſymptoms, there appears to be a fiſſure, it is uſual to apply the plaſter uſed in fractures, placing ſplints above all. When the tumour becomes ſoft, it is to be laid open by inciſion, to let out the corrupted fluid; after which a tent ſhould be put into the wound, dipped in ſome vulnerary unguent, uſing afterwards the bandage, which is applied in fractures accompanied with a wound. Some aſſert, that fiſſures, when juſt made, may be cured by the application of bandages, without the aſſiſtance of other remedies.

In fiſſures of the cranium, attended with no other bad ſymptoms, but white, yellow, or brown ſpots upon the face of the bone, it is ſufficient to bore down to the diploe, and dreſs with ſome balſamic medicine; but where any violent ſymptoms come on, which ſhew that there is an extravaſation of blood in the cavity of the cranium, the trepan is to be called in without delay. See the articles CONTRA-FISSURE and EXTRAVASATION.

FISTULA, in the antient muſic, an inſtrument of the wind kind, reſembling our flute, or flageolet. See FLUTE.

The principal wind-inſtruments of the antients, were the tibia and fiſtula. But how they were conſtituted, wherein they differed, or how they were played on, does not appear.

FISTULA, in ſurgery, a deep, narrow, and callous ulcer, generally ariſing from abſceſſes. See the article ABSCESS.

Fiſtulas differ from ſinuſes in this, that the former are callous, the latter not. See the article SINUS.

Fiſtulas attack all parts of the body without exception, particularly the anus, the perinæum, and the foramen lacrymale.

General treatment of FISTULAS. As ſoon as you diſcover that ulcers are attended with fiſtulas, not yet become callous, the readieſt way of curing them is to lay them open with the knife, to the very bottom, if it can be done with ſafety; and afterwards to cleanſe and heal them; but if the patient will not agree to the uſe of the knife, let the fiſtula be cleanſed with a proper injection. Tents ſhould never be made uſe of, but where the opening of the fiſtula is ſo ſmall as to be in conſtant danger of healing: and even in

in this case, the tent can scarcely be too short, nor the materials too soft.

The next thing to be observed is, to press the fundus as near the opening as possible. When the ulcer is cleansed, and the proper dressings applied, a small compress or a slip of plaster, doubled in that form, should be clapped upon the part where you judge the fundus of the fistula to be seated, securing all with a bolster, plaster, and bandage; taking care to make the fastenings tight upon the fundus: this will direct the matter contained within towards the opening, and the bottom will heal before the rest of the fistula.

If this method of cure is unequal to the intention of cleansing and healing, the knife is of the utmost service, especially if the fistula tends downwards, or takes such an irregular course, that the fundus cannot be pressed towards the opening. All the sinuses of the fistula being laid open by this operation, there is a passage made for a discharge of the corrupted matter, and then you can come at the diseased parts with your remedies.

Fistula *in the anus*, is a sinuous ulcer, commonly arising from a phyma, or the internal hæmorrhoides. Fistulas which arise from the phyma are the worst, very painful, and hard to be cured, on account they penetrate deep into the interstices of the muscles, and then form sinuses; and the more remote the sinuses are from the anus, so much the worse, in regard they admit of no opening by incision.

Fistulas arising from the internal hæmorrhoides, are bred gradually betwixt the coats of the intestinum rectum, and have a small perforation near the verge of the anus; from whence there issues out a thin sanies, or ichor, without pain: but in process of time, the parts are attended with itching and excoriation, the orifices at last become callous, and sometimes for a time are shut up; and then at certain intervals break out again.

Unless these fistulas are attended with great molestation, such as an exorbitant evacuation of humours, with a fœtor, or the like, they are in a great measure to be left to nature to be cured, as serving in manner of a drain, for the discharge of superfluous, peccant humours, in cacochymical and cachectical bodies: these should rather be kept open; but simple fistulas, that are recent, may be cured without danger. When a fistula in the anus is so conditioned, that an operation may be performed without danger of injuring the sphincter muscle, so as to render it incapable of retaining the excrements, there are two ways of doing it, *viz.* either by a ligature, or incision.

By ligature it is to be done thus. Let the surgeon take a thread of silk, or some horse-hair, and thread it into the eye of a leaden, or tin probe, with which let him introduce the end of the thread into the fistula, and with the fore-finger of the other hand, being anointed with oil of roses, and thrust up into the anus, let him lay hold of the end of the probe, and draw forth the thread, and then tie the two ends together, as tight as the patient can well bear it; and thus by tying it afresh every day, somewhat straiter, it will cut quite through, and the fistula will be laid open; and after that the callus must be destroyed, and the ulcer healed, *&c.*

A more expeditious way is by making an incision with an instrument, after this manner. A hollow leaden probe is to be thrust into the fistula, till it penetrates into the intestinum rectum; and then the instrument being passed into the anus, with the guidance of a finger, the fistula is to be cut according to the direction of the conductor, yet taking care not to hurt the hæmorrhoid veins, to occasion an hæmorrhage. When the incision is made, a dossil is to be put in armed with the white of an egg, and astringent powders: the callus is to be destroyed with a powder made of burnt alum, præcipitate mercury, *&c.*

Fistula *in the perinæum*, is usually the consequence of lithotomy, or making a puncture in the perinæum and bladder; or they may proceed from abscesses in the perinæum, near the urethra; or from a scirrosity of the prostate gland; or from a wound, or ulcer, which can by no means be healed up, but the lips, becoming callous, form a fistula, through which the urine is sometimes preternaturally discharged.

The treatment of these fistulas is various, according to the habit and particular disposition of the parts affected. The general treatment is as follows. Let the callous lips of the fistula be cut off, and the parts brought together by a sticking plaster, after they have been dressed by some vulnerary balsam; over the plaster should be laid a narrow compress, on each side of the wound, and the whole retained

retained by a ſtrict bandage; which done, the patient's knees are to be tied together, and ſtrict orders given him, to lie ſtill in bed, that the lips of the wound may more eaſily unite with each other. For the firſt few days after the operation, the patient ſhould be allowed very little drink, that he may not be often excited to make water, and the dreſſings ſhould not be removed till the ſecond or third day after the operation, or till the patient can contain his urine. For ſome time afterwards the patient muſt obſerve a ſtrict regimen.

FISTULA LACHRYMALIS, a diſeaſe which attacks the great caruncle in the inward corner of the eye. See the article EYE.

The firſt degree of this diſeaſe ſtops up the natural paſſage of the tears, and forces them to run down the cheek; the ſecond is when pus is mixed with the tears, which proceeds ſometimes from an opening in the ſkin, between the noſe and the great corner of the eye; the laſt is when the pus has not only corroded the neighbouring parts, which are ſoft, but has affected the bone which lies underneath. This laſt ſort of fiſtula ſometimes turns cancerous, and Riverius adviſes not to meddle with it at all.

Whatever may be the cauſe of this diſorder, whether the ſmall-pox, or french diſeaſe, it always ſtops up the naſal conduit.

If the abſceſs is not open, a time muſt be choſen when it is fulleſt of pus. For this reaſon, the eye of the patient muſt be cloſed, and ſmall long pieces of plaſter muſt be put one upon another, acroſs the eye-lids, from the puncta lachrymalia to the great angle of the eye. The ſuperior branches of the canal being thus compreſſed, that nothing can paſs that way, it will be amaſſed in the ſack, and a place proper for an inciſion ſhould then be pointed out. If the abſceſs is already open the orifice and the probe will ſhew where it is to be dilated, which muſt be done by the biſtory, both above and below, from the ſuperior part of the ſack to the edge of the orbit. The ſack being opened, it muſt be filled with dry lint, which may be taken away next day, and a pledgit dipt in a mild digeſtive applied, which muſt be repeated once or twice a day, according to the quantity of ſuppuration: when the ſuppuration begins to diminiſh at every dreſſing, a ſmall probe muſt be introduced into the naſal canal, to dilate it a little, and to leave a paſſage for the tears and the pus. This method muſt be continued till the ſuppuration is almoſt ended, then it may be dreſſed ſuperficially, with dry lint, or with a deficcative, which will complete the cure: after which it will be proper to wear a compreſſing bandage a few weeks longer to prevent its return. When the bone lies open, and it is neceſſary to penetrate into it, you muſt direct the inſtrument towards the noſe, and not towards the naſal canal, for fear of entering the ſinus maxillaris.

FISTULAR, or FISTULOUS, appellations given by ſurgeons to wounds and ulcers, which degenerate into fiſtulas. See the article FISTULA.

FISTULAR, among botaniſts, is applied to leaves and flowers that are tubular, or reſemble a hollow pipe.

FIT, in medicine, denotes much the ſame with paroxyſm. See PAROXYSM.

FITS *of eaſy reflection and tranſmiſſion*, in optics. See the articles REFLECTION and TRANSMISSION.

FITS *of the mother*, the ſame with hyſteric affection.

FITCHEE', in heraldry, a term applied to a croſs, when the lower end of it is ſharpened into a point, as in plate XCVIII. fig. 3.

Croſſes are ſometimes fitched by only a point going out from the broad foot thereof, and ſometimes they go tapering away from the center to the point, in which caſe it is ſaid to be fitcheé on the fourth part. The reaſon of this croſs's being ſo painted, Mackenzy ſuppoſes to be, that as the primitive Chriſtians were wont to carry croſſes with them whereſoever they went for devotion, when they ſettled themſelves in their journey, at any place, they might fix theſe portable croſſes in the ground.

FITCHES, in huſbandry, a ſort of pulſe, more generally known by the name of chick-pea, or cicer. See the article CICER.

Fitches are cultivated either for feeding cattle, or improving the land. They make a wholſome and nouriſhing food, whether given in the ſtraw, or thraſhed out. When ſown only to improve the ſoil, they are plowed in juſt as they begin to bloſſom, by which means a tough ſtiff clay ſoil is much enriched.

FITZ, makes part of the ſurname of ſome of the natural ſons of the kings of England, as Fitz-roy; which is purely French, and ſignifies the king's ſon.

FIVE CHURCHES, a bishop's see of Lower Hungary, 76 miles south of Buda.

FIVES, or VIVES, in farriery. See the article VIVES.

FIUME, or *St.* VEIT, a port-town of Istria, subject to the house of Austria: east long. 15°, and north lat. 45° 45'.

FIXATION, in chemistry, the rendering any volatile substance fixed, so as not to fly off upon being exposed to a great heat; hence,

FIXED BODIES are those which bear a considerable degree of heat without evaporating, or losing any of their weight. Gold is the most fixed of all metals. A quantity of very pure gold, after being placed in the eye of a glass furnace for two months, was found not to have lost any sensible part of its weight.

However, gold itself, exposed on a piece of charcoal to the focus of a burning-glass is found to diminish; and, in proportion to this diminution, there arise an infinite number of little glassy drops of a greenish colour, which swell and enlarge as the gold disappears. But this, say some, is no demonstration that the gold is vitrified: it is rather the ashes of the coal; because, if the gold be evaporated on a body which yields no ashes, you have no glass. Be this as it will, the experiment shews that gold may be evaporated; and since gold is not fixed, we may safely conclude, that there is no body absolutely so. See the articles GOLD and BURNING-GLASS.

FIXED MERCURY, See MERCURY.
FIXED NITRE, See NITRE.
FIXED SALTS, See SALT.
FIXED SIGNS, See SIGN.
FIXED STARS, See STAR.

FLACCIDITY, among physicians, a disorder of the solids, cured by astringent and cardiac medicines, joined with exercise and good air.

FLAG, a general name for colours, standards, antients, banners, ensigns, *&c.* which are frequently confounded with each other. See COLOUR, *&c.*

The fashion of pointed, or triangular flags, as now used, Rod. Toletan assures, came from the mahometan Arabs, or Saracens, upon their seizing of Spain, before which time all the engines of war were stretched, or extended on cross pieces of wood, like the banners of a church. The pirates of Algiers, and throughout the coasts of Barbary, bear an hexagonal flag.

FLAG is more particularly used at sea; for the colours, antients, standards, *&c.* borne on the tops of the masts of vessels, to notify the person who commands the ship, of what nation it is, and whether it be equipped for war or trade. See plate XCIX.

The admiral in chief carries his flag on the main top; the vice-admiral on the fore top; and the rear admiral on the mizzen-top.

When a council of war is to be held at sea, if it be on board the admiral, they hang a flag in the main shrouds; if in the vice-admiral, in the fore-shrouds; and if in the rear-admiral, in the mizzen shrouds.

Besides the national flag, merchant-ships frequently bear lesser flags on the mizzen mast, with the arms of the city where the master ordinarily resides; and on the fore-mast, with the arms of the place where the person who freights them lives.

FLAG, in french fanion, a small banner of distinction struck in the baggage-waggons of the army, to distinguish the baggage of one brigade, or battalion, from that of another, that they may be marshalled by the waggon-master-general according to the rank of their brigades, where they are to keep during the march to avoid confusion.

To lower, or strike the FLAG, is to pull it down upon the cap, or to take it in, out of the respect, or submission, due from all ships or fleets inferior to those any way justly their superiors. To lower or strike the flag in an engagement is a sign of yielding.

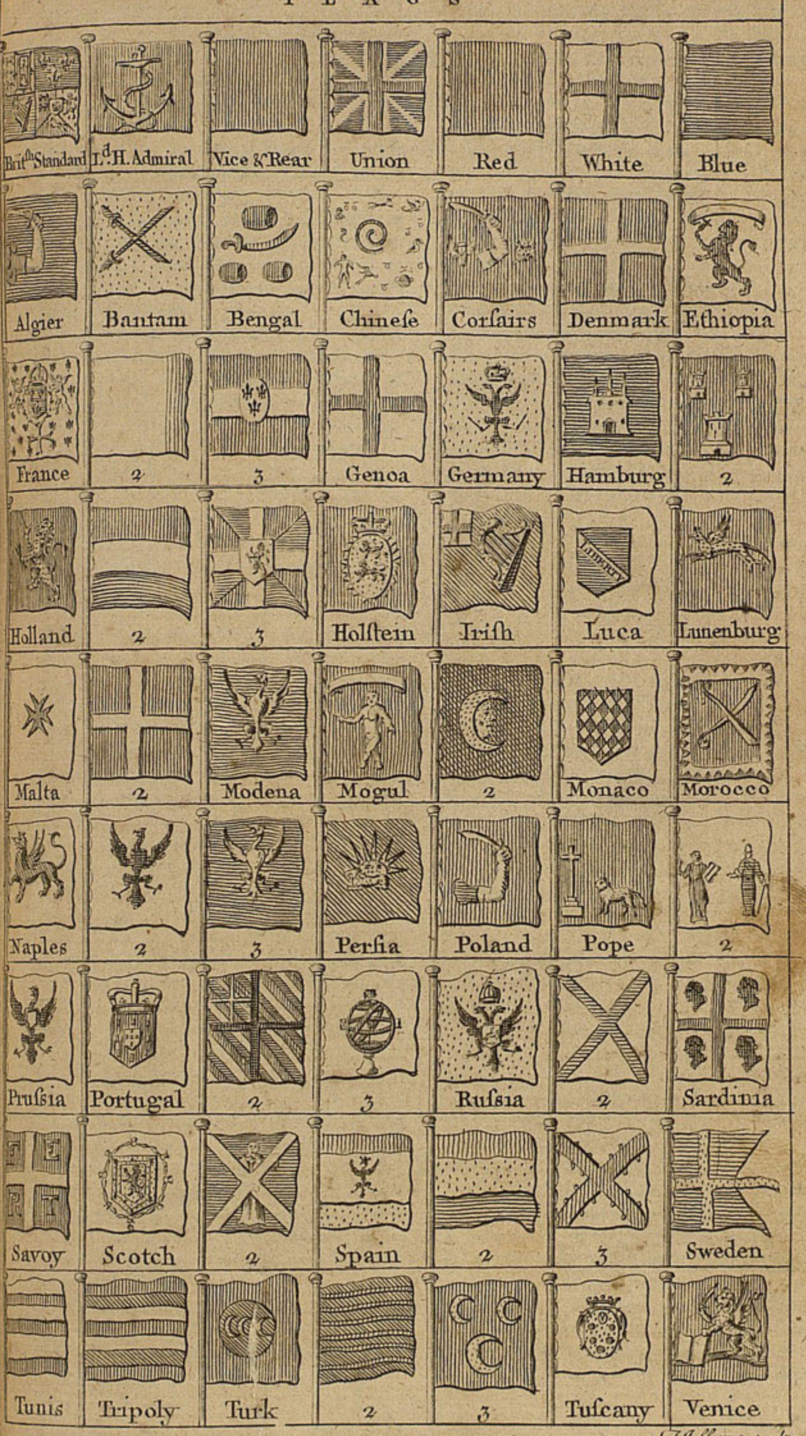
The way of leading a ship in triumph is to tie the flags to the shrouds, or the gallery, in the hind part of the ship, and let them hang down towards the water, and to tow the vessels by the stern. Livy relates, that this was the way the Romans used those of Carthage.

To heave out the FLAG, is to put out, or put abroad, the flag.

To hang out the white FLAG, is to ask quarter; or it shews when a vessel is arrived on a coast, that it has no hostile intention, but comes to trade, or the like. The red flag is a sign of defiance, and battle.

FLAG-OFFICERS, those who command the several squadrons of a fleet, such are the admirals, vice-admirals, and rear-admirals.

The flag-officers in our pay, are the admiral, vice-admiral, and rear-admiral, of



T. Jefferys sculp

of the white, red, and blue. See the article ADMIRAL.

FLAG-SHIP, a ſhip commanded by a general or flag-officer, who has a right to carry a flag, in contradiſtinction to the ſecondary veſſels under the command thereof.

FLAG-STAVES, are ſtaves ſet on the heads of the top-gallant-maſts, ſerving to let fly, or unfurl, the flag.

FLAGS, in falconry, are the feathers in a hawk's wing, near the principal ones.

FLAG is alſo uſed for ſedge, a kind of ruſh; and for the upper part of turf, pared off to burn.

FLAG-FLOWER, in botany, a plant called by botaniſts iris. See the article IRIS.

FLAG-WORM, that found in flaggy or ſedgy places. See the article WORM.

Corn-FLAG, in botany, the ſame with gladiolus. See the article GLADIOLUS.

Sweet-ſcented FLAG, a name ſometimes given to the acorus of galangal. See the article GALANGAL.

FLAGELLANTES, WHIPPERS, in church-hiſtory, certain enthuſiaſts in the thirteenth century, who maintained, that there was no remiſſion of ſins without flagellation, or whipping. Accordingly, they walked in proceſſion, preceded by prieſts carrying the croſs, and publicly laſhed themſelves, till the blood dropped from their naked backs.

FLAGELLARIA, in botany, a genus of the hexandria monogynia claſs of plants, without any flower-petals; the perianthium is divided into ſix ſegments; and the fruit is a roundiſh berry, containing a ſingle ſeed.

FLAGEOLET, or FLAJEOLET, a little flute, uſed chiefly by ſhepherds, and country people. It is made of box, or other hard wood, and ſometimes of ivory, and has ſix holes beſides that at the bottom, the mouth-piece, and that behind the neck. See the article FLUTE.

FLAIL, an inſtrument for thraſhing corn. See CORN and THRASHING.

A flail conſiſts of the following parts, 1. The hand-ſtaff, or piece held in the threſher's hand. 2. The ſwiple, or that part which ſtrikes out the corn. 3. The caplins, or ſtrong double leathers, made faſt to the tops of the hand-ſtaff and ſwiple. 4. The middle-band, being the leather-thong, or fiſh-ſkin, that ties the caplins together.

FLAIR, in the ſea-language. When a ſhip is houſed in near the water, ſo that the work above hangs over too much, it is ſaid to flair over. This makes the ſhip more roomy aloft, for the men to uſe their arms.

FLAIRE, a ſpecies of ray-fiſh, more uſually called ſkate. See the article SKATE.

FLAKE, among gardeners, a kind of ſtriped carnations, with only two colours.

FLAMBEAU, a kind of large taper, made of hempen wicks, by pouring melted wax on their top, and letting it run down to the bottom. This done, they lay them to dry; after which they roll them on a table, and join four of them together by means of a red-hot iron; and then pour on more wax, till the flambeau is brought to the ſize required.

Flambeaus are of different lengths, and made either of white or yellow wax. They ſerve to give light in the ſtreets at night, or on occaſion of illuminations.

FLAMBOROUGH-HEAD, in geography, a cape or promontory of Yorkſhire, five miles eaſt of Burlington: eaſt long. 20′, north lat. 54° 15′.

The village of Flamborough has its name, as ſome think, from the word flame, becauſe of a watch-tower here, with lights for the uſe of ſailors.

FLAME, *flamma*, in phyſiology, the ſmall parts of an inflammable or conſiderably unctuous body, that are ſet on fire, or briſkly agitated or thrown off, with a certain vibrative motion at the ſurface of that body into the open air: or in Sir Iſaac Newton's words, the flame of a body is only the ſmoke thereof heated red hot; and the ſmoke is only the volatile part of the body ſeparated by the fire. See FIRE and SMOKE.

Flame cannot exiſt without oil; whence it is that aſhes, ſand, glaſs, ſtones and earth, do not flame upon ignition, but rather damp and extinguiſh flame. As oil is then the only inflammable ſubſtance in nature, we may be directed to the means of preventing conflagrations, by uſing ſuch materials in building as contain little or no oil. And this direction might be likewiſe extended to the making incombuſtible paper, for valuable books and manuſcripts, &c.

All flame catches and exiſts only on the ſurface of inflammable bodies: whence we are led to invent methods of caſing or otherwiſe defending the wood-works of ſhips and buildings, from accidents by fire.

All inflammable bodies, as ſulphur, oil, wax, wood, &c. by flaming, waſte and vaniſh into burning ſmoke; which ſmoke, if the flame be haſtily put out, is very thick

thick and visible, and sometimes smells strongly; but in the flame, loses its smell by burning; and according to the nature of the smoke, the flame is of this or that colour: thus the flame of sulphur is blue; that of camphor, white; that of tallow, yellow, &c. When gun-powder takes fire, it goes off in a flaming smoke. Thence proceeds the difference of the colours of bodies, as viewed by day-light, candle-light, fire-light, sulphureous-light, &c.

As the pressure of the fire is greatest about the upper parts, and least towards the circumference of the base, whence the air finding least resistance from that part, drives the flame upwards; and as the fire is densest, and consequently strongest, about the middle, it thence follows, that the flame will rise higher from the middle of the fire than from its sides, where the quantity of fire is considerably lessened; and hence we see the reason of the pyramidal figure of flame.

Vital FLAME, a fine, warm, igneous substance, supposed, by some, to reside in the hearts of animals, as necessary to life; or rather as that which constitutes life itself.

To preserve this flame, they judge the air taken in by respiration, to be as necessary as it is to the conservation of ordinary flame. Others, however, not less to be depended on, find no more in the notion of a vital flame, than the natural warmth of the body, which is always as the velocity of the circulating blood, and is the effect of that circulation.

FLAMEN, in roman antiquity, the name of an order of priests, instituted by Romulus or Numa; authors not being agreed on this head.

They were originally only three, *viz.* the flamen dialis, flamen martialis, and flamen quirinus. They were chosen by the people, and installed by the sovereign pontiff. Afterwards, their number was increased to fifteen; the three first of whom were senators, and called flamines majores; the other twelve, taken from among the people, being denominated flamines minores.

The flamen dialis, or priest of Jupiter, was a considerable person at Rome; the flamen martialis, or priest of Mars, was the second in dignity; and the flamen quirinalis, was the next to him.

The greater flamens wore the robe edged with purple, like that of the great magistrates, had an ivory-chair, and sat in the senate. They wore a little band of thread (flamen) about their head; from whence, according to Varro, they had their name.

There were likewise flaminicæ, or priestesses, who were the wives of the flamines diales. These wore a flame-coloured habit, on which was painted the image of a thunder-bolt; and above their head-dress, they wore green oak boughs. They are often mentioned in inscriptions.

FLAMINGO, in ornithology, a bird otherwise called phœnicopterus. See the article PHOENICOPTERUS.

FLAMMULA, in antiquity, a kind of flag, so called from its pointed figure. It was painted of different colours, to distinguish the several battalions and companies from each other.

FLANCH, FLANQUE, or FLASQUE, in heraldry, an ordinary always borne double; being the segment of a circular superficies.

FLANDERS, a province of the Netherlands, bounded by the German sea and the United provinces, on the north; by the province of Brabant, on the east; by Hainault and Artois, on the south; and by another part of Artois and the German sea, on the west; being about sixty miles long, and fifty broad, and divided between the Austrians, the French, and the Dutch.

Flanders is a perfectly champaign country, with not a rising ground or hill in it, and watered with many fine rivers and canals. Its chief commodities are fine lace, linen, and tapestry.

FLANEL, or FLANNEL, a loose sort of woollen stuff, not crossed, and wove on a loom with two treddles, like baize.

FLANK, in the manege, the side of a horse between the ribs and haunches. A well flanked horse, is one that has wide and well made ribs, and a good body.

FLANKS *of an army*, are the troops encamped on the right and left, as the flanks of a battalion are the files on the right and left.

FLANK *of a bastion*, in fortification, that part which joins the face to the curtin. See the article BASTION.

Engineers differ very much about raising the flank, some making it perpendicular to the face, some to the curtin, and others to the line of defence; some again make it an angle of 98° with the curtin, whereas Vauban makes it the chord of a segment, whose center is the angle of the shoulder of the next bastion. Its

ufe is to defend the curtin, and the flank and face of the oppofite baftion; to defend the paffage of the moat, batter the falliant angles of the counterfcarp and glacis, from whence the befiegers ruin the flanks with their artillery, in order to take away the defence of the oppofite baftion.

Oblique FLANK, or *second* FLANK, that part of the curtin, from whence the face of the oppofite baftion may be difcovered.

Retired FLANK, or *low* FLANK, or *covered* FLANK, one of the platforms of the cazemate. See article CAZEMATE.

Thefe retired flanks are a great defence to the oppofite baftion, and to the paffage of the moat, becaufe the befiegers cannot fee nor eafily difmount their guns. The curtin is efteemed the ftrongeft part of a fortification, becaufe flanked at both ends; and the face is accounted the weakeft, as having only one defence from the oppofite flank.

FLANKED, *flanquée*, in heraldry, is ufed by the French to exprefs our parti per faltier.

Coats, however, makes it to be the fame with flanch. See the article FLANCH.

FLANKED ANGLE, in fortification, that formed by the two faces of a baftion.

FLANKING ANGLE, or *angle of the* TENAILLE, that compofed of the two lines of defence, and pointing towards the curtin. See the article TENAILLE.

FLANKING *line of defence*. See the article LINE *of defence*.

FLASK, a horn, or the like, made for carrying of powder, having a meafure for the charge of the piece for the top.

FLAT, in the fea-language. To flat in the fore-fail, is to hail it in by the fheet, as near the fhip's fide as poffible; which is done, when a fhip will not fall off from the wind.

FLATS, in mufic, a kind of additional notes, which, together with fharps, ferve to remedy the defects of mufical inftruments, wherein temperament is required. See TEMPERAMENT and SHARP.

The natural fcale of mufic being limited to fixed founds, and adjufted to an inftrument, the inftrument will be found defective in many points; and particularly, in that we can only proceed from any note by one particular order of degrees; that for this reafon, we cannot find any interval required, from any note upwards or downwards; and that a fong may be fo contrived, as that if it be begun by any particular note or letter, all the intervals, or other notes, fhall be juftly found on the inftrument, or in the fixed feries; yet were the fong begun with any other note, we could not fo proceed. See the articles SCALE and INTERVAL.

To remove or fupply this defect, muficians have recourfe to a fcale proceeding by twelve degrees, that is thirteen notes to an octave, including the extremes; which makes the inftrument fo perfect, that there is but little reafon to complain. This, therefore, is the prefent fyftem or fcale for inftruments that have their founds fixed, *viz.* betwixt the extremes of every tone of the natural fcale, is put a found or note, which divides it into two unequal parts, called femi-tones: hence the whole may be called the femitonic fcale, containing twelve femi tones betwixt thirteen notes, in the compafs of an octave.

Now to preferve the diatonic feries diftinct, thefe inferted notes either take the name of the natural note next below, with the character ♯, called a fharp; or the name of the natural note next above it, with the character ♭, called a flat. Thus D ♭, or D flat, fignifies a femi-tone below D natural; and it is indifferent, in the main, whether the inferted note be accounted as a flat or fharp.

This femi-tonic feries, or fcale, is very exactly reprefented by the keys of the organ, &c. the lowermoft range of keys being the natural or diatonic notes; and thofe behind, the artificial ones, or the flats and fharps.

FLATTING, in gilding, is the giving the work a light touch, in the places not burnifhed, with a pencil dipt in fize, in which a little vermilion is fometimes mixt. This ferves to preferve and prevent its flawing, when handled. See GILDING.

FLATULENCY, in medicine, a diforder of the bowels arifing from a weak ftomach, and crude flatulent aliment, as peafe, beans, lentiles, coleworts, hard fat flefh, and the like; which degenerate into wind, creating great anxiety if not evacuated, and difficulty of breathing.

Another caufe of flatulencies are congeftions of blood in the branches of the vena porta; whence proceed anxieties of the præcordia, difficult breathing, colic pains, heart-burn, head-achs, vertigo, and watchfulnefs.

If the flatulencies arife from crudities in the ftomach, evacuations are firft of all neceffary; after which may be given bit-

ters, aromatics, carminatives, and ſtrengtheners, with a ſpare diet and exerciſe. If it proceeds from congeſtions of blood, as is the caſe of hypochondriacs, a vein muſt be opened; and if the body is coſtive, an emollient clyſter or a gentle laxative will be proper. If theſe fail, chalybeate medicines are to be called in, as tincture of vitriol of iron, ſteel-filings finely powdered, from ſix to ten grains, or oil of cinnamon with ſugar or bitters, ſpaw-waters, and conſtant exerciſe.

FLATULENT TUMOURS, in ſurgery. See the article PNEUMATOCELE.

FLAUTINO, in muſic, the ſame with flageolet. See the article FLAGEOLET.

FLAW, in the ſea language, ſignifies a ſudden guſt of wind.

FLAX, *linum*, in botany. See LINUM.

Flax is an excellent commodity, and the cultivation of it a good piece of huſbandry. It will thrive in any ſound land, but that which has lain long fallow is beſt; which being well plowed, and laid flat and even, the ſeeds muſt be ſown in a warm ſeaſon, about the middle or end of March, or at fartheſt the beginning of April; and if a wet ſeaſon happen, weeding will be neceſſary. The beſt ſeed is that brought from the eaſt country, which, tho' dear, yet eaſily repays the charge: this will laſt two or three crops, when it is adviſeable to renew the ſeeds again. Of the beſt ſeed, two buſhels may ſerve for an acre; but more muſt be allowed of home-ſeed, becauſe it grows ſmaller. When grown up, it ought not to be gathered before it be fully ripe; for if pulled before the bloſſom falls, it hackles away almoſt to nothing; and, tho' in appearance very fine, yet it has no ſubſtance, and the yarn ſpun of it is weak and ouzy: it not only waſtes in the waſhing, but the linen made of it grows extremely thin in the bleaching. The pluckers ſhould be nimble, tie it up in handfuls, ſet them up till perfectly dry, and then houſe them. Flax pulled in the bloom, proves whiter and ſtronger than if left ſtanding till the ſeed is ripe; but then the ſeed will be loſt. An acre of good flax, is accounted worth from ſeven to twelve pounds, or more.

Dreſſing of FLAX. When flax has been watered, and twice ſwingled, as directed under the articles WATERING and SWINGLING, it is then to be heckled in a much finer heckle than that uſed for hemp. Hold the ſtrike of flax ſtiff in your hand, and break it very well upon the coarſe heckle; ſaving the hurds to make harden cloth of. This done, the ſtrike is to be paſſed through a finer heckle, and the hurds coming from thence ſaved for middling cloth, and the tear itſelf for the beſt linen.

But to dreſs flax for the fineſt uſe of all, after being handled as before, and laying three ſtrikes together, plat them in a plat of three rows, as hard and cloſe together as you can; joining one to the end of another, till you have platted as much as you think convenient: then begin another plat, and add as many ſeveral ones, as you think will make a roll; afterwards wreathing them hard together, make up the roll; which done, put as many as you judge convenient into a hemp-trough, and beat them ſoundly, rather more than leſs than you do hemp. Next open and unplat them, dividing each ſtrike very carefully from each other; and ſo ſtrike it through the fineſt heckle of all, whereof there are three ſorts. Great care muſt be taken to do this gently and lightly, leſt what is heckled from thence ſhould run to knots; for if preſerved ſoft like cotton, it will make very good linen, each pound running at leaſt two yards and an half. The tear itſelf, or fineſt flax, will make a ſtrong and very fine holland, running at leaſt five yards in the pound. See SPINNING.

In Scotland, they have a lint-mill, which greatly facilitates the dreſſing of flax; which if done by the hand, will coſt 32d. the ſtone; whereas it may be dreſſed at the mill for 2s. the ſtone, which is one fourth ſaved.

Laws regarding FLAX *and hemp.* Any perſon may ſet up the trade of breaking, heckling, and dreſſing of flax or hemp; alſo of ſpinning, weaving, making, whitening, *&c.* cloth made of hemp or flax only; and that in all places, corporate or incorporate, privileged or not. Foreigners uſing the foreſaid trade for three years, ſhall, upon taking the oaths to the government, enjoy all the privileges of natural ſubjects. Rough or undreſſed flax, imported from abroad, pays no duty; but that which is dreſſed or wrought, pays every hundred weight 4 l. 10 s. $5\frac{25}{100}$d. whereof, upon exporting it, is drawn back 4 l. 3 s. $3\frac{15}{100}$d. However, it is to be obſerved, that all manner of flax, wrought or unwrought, may be imported from Ireland free of all duty, provided

vided it be done in britiſh or iriſh bottoms.

Purging-FLAX, *linum catharticum.* See the article LINUM.

FLEA, *pulex*, in zoology, a genus of inſects without wings, of a roundiſh, compreſſed figure: the legs are three pair, and formed for leaping: the eyes are two, and ſimple: the mouth is bent downward: the colour is a deep purple, approaching to black.

The flea is an inſect which infeſts birds, as well as quadrupedes, and lays eggs, called nits: theſe produce a kind of nymphs, or white worms; which after ſome time are transformed, in the manner of caterpillars, into perfect fleas.

FLEA-BANE, in botany, a name given to the plant called by authors conyza. It got the name of flea-bane, from its ſuppoſed virtue of killing fleas. See CONYZA.

African FLEA-BANE, a plant called by botaniſts parthenium. See PARTHENIUM.

Sweet FLEA-BANE, the ſame with the erigeron of botaniſts.

FLEA-BITTEN, that colour of a horſe, which is white or grey, ſpotted all over with dark reddiſh ſpots. See HORSE.

FLEA-WORT, the engliſh name of the pſyllium of botaniſts.

FLEAM, in ſurgery and farriery, an inſtrument for letting a man or horſe blood. A caſe of fleams, as it is called by farriers, comprehends ſix ſorts of inſtruments; two hooked ones, called drawers, and uſed for cleaning wounds; a pen-knife; a ſharp-pointed lancet, for making inciſions; and two fleams, one ſharp and the other broad-pointed. Theſe laſt are ſomewhat like the point of a lancet, fixed in a flat handle, only no longer than is juſt neceſſary to open the vein.

Many of the german ſurgeons let blood with a fleam, repreſented in plate XCVIII. fig. 4. They hold the part B in their hand; and, applying the point A to the vein, ſtrike the part C with one of the fingers of the other hand. Others uſe a neater inſtrument, or ſpring-fleam, repreſented, *ibid.* n° 2. This being drawn up, they apply the point A to the vein, and then let it go by preſſing upon B.

However, as the poſition and ſize of the veins are different in different perſons, the lancet is found to be the moſt convenient inſtrument for this purpoſe. See the article LANCET.

Fleams imported, beſides the duty on ſteel, pay each $\frac{38\frac{1}{2}}{100}$ d. and draw back on exportation $\frac{34\frac{1}{4}}{100}$ d. See STEEL.

FLECHE, a town of France, under the meridian of London, twenty miles north-eaſt of Angers.

FLEECE, the covering of wool, ſhorn off the bodies of ſheep. See WOOL.

Order of the golden FLEECE, an order of knighthood inſtituted by Philip II. duke of Burgundy. Theſe knights at firſt were twenty four, beſides the duke himſelf, who reſerved the nomination of ſix more: but Charles V. encreaſed them to fifty. He gave the guardianſhip of this order to his ſon Philip king of Spain, ſince which the Spaniſh monarchs are chiefs of the order. The knights had three different mantles ordained them at the grand ſolemnity, the collar and fleece.

FLEET, commonly implies a company of ſhips of war, belonging to any prince or ſtate: but ſometimes it denotes any number of trading ſhips, employed in a particular branch of commerce.

In ſailing, a fleet of men of war is uſually divided into three ſquadrons; the admiral's, the vice-admiral's, and the rear-admiral's ſquadron, all which, being diſtinguiſhed by their flags and pendants, are to put themſelves, and, as near as may be, to keep themſelves in their cuſtomary places, *viz.* The admiral, with his ſquadron, to ſail in the van, that ſo he may lead the way to all the reſt in the day-time, by the ſight of his flag in the main-top-maſt head; and in the night-time, by his lights or lanterns. The vice admiral and his ſquadron, is to ſail in the center, or middle of the fleet, the rear-admiral, and the ſhips of his ſquadron, to bring up the rear. But ſometimes other diviſions are made, and thoſe compoſed of the lighter ſhips and the beſt ſailors, are placed as wings to the van, center, and rear. See the articles SQUADRON, ADMIRAL, FLAG, *&c.*

For the diſpoſition of a fleet in time of a ſea-engagement or battle, ſee the article BATTLE.

Merchant-fleets generally take their denomination from the place they are bound to, as the Turky fleet, Eaſt-India fleet, *&c.* Theſe, in time of peace, go in fleets for their mutual aid and aſſiſtance: in time of war, beſides this ſecurity, they likewiſe procure convoys of men of war, either to eſcort them to the places whither they are bound, or only a part of the way, to a certain place or latitude, beyond

yond which they are judged out of danger of privateers, &c. See the article CONVOY.

FLEET is alfo a noted prifon in London, where perfons are committed for contempt of the king and his laws, particularly of his courts of juftice: or for debt, where any perfon will not, or is unable to pay his creditors.

There are large rules and a warden belonging to the fleet prifon, which had its name from the float or fleet of the river or ditch, on the fide whereof it ftands.

FLEMISH, or the FLEMISH TONGUE, is that which we otherwife call low Dutch, to diftinguifh it from the German, whereof it is a corruption, and a kind of dialect. It differs from the Walloon, which is a corruption of the french language. The Flemifh is ufed through all the provinces of the Netherlands.

FLEMISH BRICKS, a neat, ftrong, yellow kind of bricks, brought from Flanders, and commonly ufed in paving yards, ftables, &c. being preferable for fuch purpofes to the common bricks.

FLENSBURGH, a port-town fubject to Denmark, fixteen miles north of the city of Slefwick.

FLESH, *caro*, in anatomy, a fimilar, fibrous part of an animal body, foft and bloody, being that whereof moft of the other parts are compofed, and whereby they are connected together: or more properly, it is fuch parts of the body where the blood veffels are fo fmall, as only to retain blood enough to preferve their colour red.

The antient anatomifts reckoned five different kinds of flefh. 1. Mufculous, fibrous, or fiftular flefh; fuch as is the fubftance of the heart and other mufcles. 2. The parenchymous flefh, as that of the lungs, liver, and fpleen: but fince the ufe of glaffes, it is plainly difcovered that there is no fuch thing as a parenchyma, properly fpeaking, but that all the vifcéra, as well as other parts of the body, are vafcular, and nothing but plexus, or net-work, of fmall veffels and canals. 3. Vifcerous, fuch as the flefh of the ftomach and guts. 4. Glandulous, as that of the tonfils, the pancreas, the breafts, &c. 5. Spurious, fo they called the flefh of the lips, gums, the glans of the penis, &c. becaufe it is of a conftitution different from all the reft.

The moderns admit only one kind of flefh, *viz.* the mufcular. Sometimes, however, they apply the term to the glands, which they call, by way of diftinction, glandulous flefh.

The flefh of young animals abounds with a foft and nourifhing juice, but that of the older is more nourifhing. The juices of old animals are fpirituous, gelatinous, and agreeable to the tafte, but the flefh is hard and difficult of digeftion. The flefh of wild animals more light and digeftible than that of tame.

Dr. Hales propofes to falt the flefhes put on fhipboard, by injecting hydroftatically a ftrong brine into the blood-veffels of animals, immediately after they are killed.

FLESH, among botanifts, is all the fubftance of any fruit that is between the outer rind and the ftone; or that part of any root that is fit to be eaten.

FLESH-COLOUR. See CARNATION.

FLEUR DE LISE'E, in heraldry, the fame with flory. See the article FLORY.

FLEURY, a town of Burgundy, in France, thirty miles north of Chalons.

FLEXIBLE, in phyfics, a term applied to bodies capable of being bent or diverted from their natural figure or direction.

Every flexible body, fay the fchoolmen, is porous, and that in fuch a manner, as that the pores or chambers may become longer or fhorter; and if any corporeal fubftance fills thefe pores, it muft be conceived fo fubtile as to be eafily expelled by compreffion, or at leaft capable of being driven from one chamber to another, according as the body is bent in this or that direction.

FLEXION, in anatomy, is applied to the motion by which the arm or any other member of the body is bent. It is alfo applied to the mufcles, nerves, &c.

FLEXION or FLEXURE *of curves*. See the article FLEXURE.

FLEXOR, in anatomy, a name applied to feveral mufcles, which are fo called from their office, which is to bend the part to which they belong, in oppofition to the extenfors, which open or ftretch them, as, 1. Flexors of the head, which are the maftoidæus, the rectus major anticus, and the rectus minor anticus. 2. Flexors of the neck, *viz.* the fcalenus and longus. 3. Flexors of the back and loins, the quadratus lumborum, the pfoas parvus, the intertranfverfales lumborum. 4. Flexors of the cubitus, the brachiæus externus, and brachiæus internus. 5. Flexors of the carpus, the radiæus internus, the ulnaris internus, and the palmaris. 6. Flexors of the firft, fecond, and third phalanx of the fingers, *viz.* the four

lumbricales, the sublimis or perforatus, and the perforans or profundus. 7. Flexors of the thigh, called also elevators, the psoas magnus, the iliacus, and the pectinæus, called also lividus. 8. Flexors of the tibia, the gracilis, the semimembranosus, the seminervosus, the biceps, and the poplitæus. 9. Flexors of the tarsus or foot, the tibialis anticus, and the peronæus anticus. 10. Flexors of the phalanges of the toes, the lumbricales, the perforatus, the perforans, and the flexor longus of the great toe, whose origin is in the posterior part of the fibula, and its termination in the lower part of the last phalanx, together with the flexor brevis, the origin of which is from the middle os cuneiforme, and its termination at the two sesamoide bones of the great toe, which are joined by ligaments to its first phalanx. See MASTOIDÆUS, RECTUS, SCALENUS, BRACHIÆUS, *&c. &c.*

FLEXURE *of curves*, in the higher geometry, is used to signify that a curve is both concave and convex, with respect to a given right line A *p*, or a fixed point P (plate XCVIII. fig. 5. n° 1.). Thus the curve C M D having the part C M concave towards A P or P, and the part M D convex to the same, is said to have a flexure: and the point M which limits the concavity and convexity, is called the point of inflexion or contrary flexure. See the article INFLECTION.

This is to be understood when the point, supposed to describe the curve, coming to M, continues its course towards the same side; but if it turn backwards, as in n° 2, 3, 4, *ibid.* the curve may either have a continued curvature, as in n° 4, or have a cuspis point of reflection or of retrogradation, as in n° 2, 3. As to the method of finding the points of contrary flexure, see l'Hospital's Anal. inf. Petit. sect. 4.

FLIGHT, in general, denotes the act of flying. See the article FLYING.

FLIGHT in heraldry. See the article VOL.

FLIGHT *of a stair-case.* See STAIR-CASE.

FLINGING, in the manege, the same with yerking. See the article YERKING.

FLINT, *silex*, in natural history, a semipellucid stone, composed of crystal debased with earth, of one uniform substance, and free from veins; but of different degrees of colour, according to the quantity of earth it contains, and naturally surrounded with a whitish crust.

Flint is a stone of an extremely fine, compact, and firm texture, and very various, both in size and figure. It is of all the degrees of grey, from nearly quite black, to almost quite white. It breaks with a fine, even, glossy surface; and is moderately transparent, very hard, and capable of a fine polish. It readily strikes fire with steel, and makes not the least effervescence with aquafortis, and burns to a whiteness. Its uses in glass-making, *&c.* are too well known to need a particular recital.

It is not uncommon to find on our shores fine, pellucid, flinty bodies, streaked or veined with white, black, brown, *&c.* These are the agates of this country, and answer in every particular, but fineness, to the gem. See the article AGAT.

The manner of preparing flints for the nicer operations in the glass-trade, is this: after freeing them from the white crusts with which they are commonly surrounded, calcine them in a strong fire; then powdering them in an iron mortar, sift the powder through a very fine sieve: pour upon this powder some weak aquafortis, to dissolve any particles of iron it may have got from the mortar; then, after standing some time, wash it well with hot water, and dry it for use.

Oil of FLINTS, a name given to the liquor obtained from a mixture of four ounces of calcined and powdered flints, with twelve ounces of salt of tartar: this being melted together in a strong fire, runs into glass; which is to be powdered and set in a cellar, where it runs into an oil per deliquium.

FLINT-CASTLE, an old town and castle, which gives name to Flintshire, in Wales, is situated on the river Dee, ten miles east of St. Asaph, and sends one member to parliament: west long. 3° 12′, north lat. 53° 20′.

FLIP, a drink common among sailors, made up of malt-liquor, brandy, and sugar, mixed together.

FLIX, a town and castle of Catalonia, in Spain, twenty miles north of Tortosa.

FLIX-WEED, a genus of plants called by authors erysimum. See ERYSIMUM.

FLOAT *of a fishing-line*, the cork or quill that floats or swims above water. See the article FISHING.

The quills of muscovy ducks are the best floats for slow waters, but for strong streams, cork-floats are the best; for which purpose take a good sound cork, without flaws or holes, and bore it thro' with a hot iron, into which put a quill of a fit proportion; then pare the cork into

into a pyramidal form, of what fize you pleafe, and then grind it fmooth.

Float alfo fignifies a certain quantity of timber bound together with rafters, athwart, and put into a river to be conveyed down the ftream; and even, fometimes, to carry burdens down a river with the ftream.

Float-boards, thofe boards fixed to water-wheels of under-fhot mills, ferving to receive the impulfe of the ftream, whereby the wheel is carried round. See the article Wheel and Mill.

It is no advantage to have too great a number of float-boards, becaufe, when they are all ftruck by the water in the beft manner that it can be brought to come againft them, the fum of all the impulfes will be but equal to the impulfe made againft one float-board at right angles, by all the water coming out of the penftock through the opening, fo as to take place on the float-board. The beft rule in this cafe is to have juft fo many, that each of them may come out of the water as foon as poffible, after it has received and acted with its full impulfe. As to the length of the float-board, it may be regulated according to the breadth of the ftream. See the article Mill.

FLOATAGES, all things floating on the top of the fea or any water, a word much ufed in the commiffions of water-bailiffs.

FLOATINGS, in hufbandry, the drowning or watering of meadows.

Floating *of cheefe*, among houfe-wives, feparating the whey from the curd. See the article Cheese.

Floating-bridge. See Bridge.

Floating-islands. See Island.

FLOOD, a deluge or inundation of waters: See the article Deluge.

Flood, among feamen, is when the tide begins to come up, or the water begins to rife, then they call it young flood; after which it is a quarter flood, half flood, and high flood. See the article Tide.

Flood-mark, the mrak which the fea makes on the fhore, at flowing water, and the higheft tide: it is alfo called high-water mark.

Sand Flood. See Sand Flood.

FLOOK, or Fluke, of an anchor. See the article Anchor.

FLOOKING, among miners, a term ufed to exprefs a peculiarity in the load of a mine. The load or quantity of ore is frequently intercepted in its courfe, by the croffing of a vein of earth or ftone, or fome different metallic fubftance; in which cafe the load is moved to one fide, and this tranfient part of the land is called a flooking.

FLOOR, in architecture, the under fide of a room, or that part we walk on.

Floors are of feveral forts, fome of earth, fome of brick, fome of ftone, and fome of wood.

Earthen floors are commonly made of loam, and fometimes, when they are defigned to make malt on, of lime and brook-fand, and gun-duft, or anvil-duft, from the forge.

The manner of making thefe floors for plain country habitations, is as follows. Take two thirds of lime, and one of coal-afhes well fifted, with a fmall quantity of loam clay; mix the whole together, and temper it well with water, making it up into a heap: let it lie a week or ten days: then temper it well over again. After which heap it up for three or four days, and repeat the tempering very high, till it become fmooth, yielding, tough and glewy. Then the ground being levelled, lay your floor therewith, about two and a half or three inches thick, making it fmooth with a trowel: the hotter the feafon is the better; and when it is thoroughly dried, it will make the beft floor for houfes, efpecially for malt-houfes.

If any would choofe to have their floors look better, let them take lime made of rag-ftones, well tempered with whites of eggs, covering the floor about a quarter or half an inch thick with it, before the under flooring be too dry. If this is well done, and thoroughly dried, it will look, when rubbed with a little oil, as tranfparent as metal or glafs.

For brick and ftone floors, fee the article Pavement.

Carpenters, by the word floor, underftand as well the framed work of timber, as the boarding over it.

Concerning boarded floors, it is to be obferved, that the carpenters never floor rooms with boards, till the carcafe of the houfe is fet up, and alfo is inclofed with walls, left the weather fhould wrong the flooring; yet they generally rough-plane the boards for flooring, before they begin any thing elfe about the building, that they may fet them by to feafon; which is done by laying them flat upon three or four balks, each board about the breadth of a board afunder, the whole length of the balks: then, by laying another lay of boards athwart the laft, and fo on till they have laid them all in this manner,

manner, by which means they lie hollow for the air to play between them.

The beſt way of placing the principal timbers in a floor, is not to lay them over doors or windows, nor too near chimnies: the boards ſhould all lie one way, which is generally the way that you have the beſt viſto.

FLOOR *of a ſhip* is ſo much of her bottom as ſhe reſts upon, when ſhe reſts on the ground. See the article SHIP.

Such ſhips as have long, and withal broad floors, lie on the ground with moſt ſecurity; and thoſe that are narrow in the floor, cannot be grounded without danger either of being overſet, or at leaſt of hurting their ſides.

FLORAL, in general, ſomething belonging to a flower. See FLOWER.

Thus floral leaves are thoſe found only near flowers.

FLORAL GAMES, in roman antiquity, annual games inſtituted in honour of the goddeſs Flora, which began to be celebrated on the fourth of the calends of May, or April 28, and were continued to the calends, or firſt of May.

The floralia, or floral games, were celebrated in the Campus Martius, being firſt proclaimed by ſound of trumpet; and during the celebration, the ædiles ſcattered all manner of pulſe among the people. It is alſo ſaid, that during the floralia, harlots danced naked, playing a thouſand laſcivious tricks. They were firſt inſtituted in the 513th year of Rome.

FLORENCE, an archbiſhop's ſee and a city of Italy, ſituated on the river Arno, in Tuſcany, forty-five miles eaſt of Leghorn: eaſt long. 12° 15′, and north lat. 43° 30′.

Florence is one of the moſt elegant towns in Italy, has an univerſity, and is ſix miles in circumference. The ſtatues, paintings, and curioſities in the grand duke's palace are the admiration of travellers.

FRORENTINE, a town of Champaign in France, twenty-eight miles ſouth-weſt of Troyes.

FLORES, FLOWERS. See the articles FLOWER and FLOS.

FLORES, in geography, one of the Azores-iſlands, ſubject to Portugal.

FLORID STYLE is that too much inriched with figures and flowers of rhetoric.

Longinus uſes the terms *florid* and *affected ſtyle* indifferently, and lays them down as quite contrary to the true ſublime. See the article STYLE.

FLORIDA, in geography, a name firſt given by the Spaniards to all that part of North America which lies north of the gulph of Mexico. However, all that retains the name Florida, at preſent, is the peninſula between the colony of Georgia and Cape Florida, *viz.* between 25° and 30° of north latitude, and between 81° and 85° weſt longitude.

FLORILEGE, *florilegium*, a name the Latins have given to what the Greeks call ἀνθολογιον, anthology. See the article ANTHOLOGION.

FLORIN, is ſometimes uſed for a coin, and ſometimes for a money of account.

Florin as a coin, is of different values, according to the different metals and different countries where it is ſtruck. The gold florins are moſt of them of a very coarſe alloy, ſome of them not exceeding thirteen or fourteen carrats, and none of them ſeventeen and a half. As to ſilver florins, thoſe of Holland are worth about 1 s. 8 d. thoſe of Genoa were worth $8\frac{1}{4}$ d. ſterling.

Florin, as a money of account, is uſed by the italian, dutch, and german merchants and bankers, but admits of different diviſions in different places: in Holland it is on the footing of the coin of that name, containing 20 ſtivers. At Frankfort and Nuremberg it is equivalent to 3 s. ſterling, and is divided into creutzers, and pfinnings. At Liege it is equivalent to 2 s. 3 d. At Straſbourg, to 1 s. 8 d. In Savoy, to 11 d. At Genoa, to $8\frac{1}{2}$ d. And at Geneva, to $6\frac{1}{2}$ d. See the article COIN.

FLORINIANS, *floriniani*, in church hiſtory, a ſect of heretics, of the IId century, ſo denominated from their leader Florinus, who made God the author of evil. They are a ſpecies of the gnoſtics, but deny the judgment and reſurrection, and hold that our Saviour was not born of a virgin. They were alſo called borborites. See the article BORBORITES.

FLORIST, *floriſta*, according to Linnæus, is an author or botaniſt, who writes a treatiſe called Flora, comprehending only the plants and trees to be found growing naturally in any place. However, in the more common acceptation of the word, floriſt ſignifies a perſon well ſkilled in flowers, their kinds and cultivation. See the article FLOWER.

FLORY, FLOWRY, or FLEURY, in heraldry,

raldry, a crofs that has the flowers at the end circumflex and turning down, differing from the potence, inafmuch as the latter ftretches out more like that which is called patee. See the articles POTENCE and PATEE.

The crofs flory is reprefented in plate XCVIII. fig. 2.

FLOS, FLOWER, in botany. See the article FLOWER.

FLOS, in chemiftry, the moft fubtile part of bodies feparated from the more grofs parts by fublimation, in a dry form. 1. *Flores benzoini*, flowers of benjamin, are prepared in the following manner: put powdered benjamin into an earthen pot, placed in fand, and with a fmall heat the flowers will rife, and may be caught by a paper-cone placed over the pot. See the article BENZOIN. 2. *Flores fulphuris*, flowers of fulphur: let fulphur be fublimed in a fit veffel; and any part of the flowers which may have concreted are to be reduced to powder by a wooden mill, or in a marble mortar with a wooden peftle. They are ufed in difeafes of the breaft, and likewife in cutaneous diftempers, both internally and externally. 3. *Flores fulphuris loti*, flowers of fulphur wafhed: pour water on the flowers, to the height of three or four fingers above them, and boil them for a time; then pour off this water, and with frefh cold water wafh the remains of this away; then dry the flowers for ufe. 4. *Flores martiales*, martial flowers: take of wafhed colcothar of green vitriol, or of iron-filings, one pound; of fal ammoniac, two pounds: mix and fublime them in a retort; and mixing again the bottom with the flowers, renew the fublimation till the flowers acquire a beautiful yellow colour: to the refidue may be added half a pound of frefh fal ammoniac, and the fublimation repeated; and the fame procefs may be continued, as long as the flowers rife duly coloured. They are reckoned very attenuating and aperient, and therefore are prefcribed in many obftructions, and in afthmas. 5. *Flores bifmuthi*, flowers of bifmuth, are ufed as a fucus, being mixed with pomatum or rofe-water, *&c.*

FLOSCULOUS, among botanifts, an appellation given to compound flowers, made up of a number of leffer ones, all inclofed in the fame common cup.

The plants with flofculous flowers make one of Tournefort's claffes, called by Linnæus fyngenefia. See the articles BOTANY and SYNGENESIA.

FLOTA, or FLOTTA, FLEET, a name which the Spaniards give particularly to the fhips that are annually fent from Cadiz to the port of Vera Crux, to fetch thence the merchandizes gathered in Mexico for Spain. This fleet confifts of the captains, admiral, and patach or pinnance, which goes on the king's account; and about fixteen fhips, from four hundred to a thoufand tons, belonging to particular perfons. They fet out from Cadiz about the month of Auguft, and make it about eighteen or twenty months before they return.

FLOTILLA, a name given to a number of fhips which get before the reft in their return, and give information of the departure and cargo of the flota and galleons. See the preceding article.

FLOTSON, or FLOTSOM, goods that by fhipwreck are loft, and floating upon the fea; which, with jetfon and lagan, are generally given to the lord admiral: but this is the cafe only where the owners of fuch goods are not known. And here it is to be obferved, that jetfon fignifies any thing that is caft out of a fhip when in danger, and afterwards is beat on the fhore by the water, notwithftanding which the fhip perifhes. Lagan is where heavy goods are thrown overboard, before the wreck of the fhip, and fink to the bottom of the fea.

FLOUNDER, the englifh name of a well-known fifh, called by ichthyologifts the pleuronectes with the eyes on the right fide, the lateral or fide lines rough, and fmall fpines at the fins. See the article PLEURONECTES.

The flounder is a well tafted fifh, known in fome parts of the kingdom by the names fluke and bul.

FLOUR, the meal of wheat-corn, finely ground and fifted.

The grain itfelf is not only fubject to be eaten by infects in that ftate, but when ground into flour it gives birth to another race of deftroyers, who eat it unmercifully, and increafe fo faft in it, that it is not long before they wholly deftroy the fubftance. The fineft flour is moft liable to breed thefe, efpecially when ftale, or ill prepared. In this cafe, if it be examined in a good light, it will be perceived to be in a continual motion; and on a nicer infpection, there will be found in it a great number of little animals, of the

the colour of the flour, and very nimble. If a little of this flour be laid on the plate of the double microscope, the insects are very distinctly seen in great numbers, very brisk and lively, continually crawling over one another's backs, and playing a thousand antick tricks together, whether for diversion, or in search of food, is not easily determined. These animals are of an oblong and slender form; their heads are furnished with a kind of trunk, or hollow tube, by means of which they take in their food, and their body is composed of several rings. They do vast mischief among the magazines of flour laid up for armies, and other public uses: when they have once taken possession of a parcel of this valuable commodity, it is impossible to drive them out; and they increase so fast, that the only method of preventing the total loss of the parcel, is to make it up into bread as soon as can be done. The way to prevent their breeding in the flour, is to preserve it from damp: nothing gets more injury by being put up in damp, than flour; and yet nothing is more frequently put up so. It should be always carefully and thoroughly dried, before it is put up; and the barrels also dried into which it is to be put; then, if they are kept in a room tolerably warm and dry, they will keep it well. Too dry a place never does flour any hurt, though one too moist always spoils it.

FLOUR, in geography, a city of the Lyonois, in France, forty-five miles south of Clermont.

FLOWER, *flos*, among botanists and gardeners, the most beautiful part of trees and plants, containing the organs or parts of fructification. See the article FRUCTIFICATION.

The parts of a flower are the ovary or pistil, the corolla or flower-petals, the stamina or chives, the empalement or calyx, the perianthium, pericarpium, and fruit. See the articles PISTIL, COROLLA, STAMINA, &c.

According to the number of petals, or flower-leaves, flowers are called monopetalous or one-leaved, dipetalous or two-leaved, tripetalous or three-leaved, &c.

Flowers are again distinguished into male, female, and hermaphrodite: the male flowers are those containing stamina, without any pistil or fruit, commonly called stamineous flowers. The female flowers are such as contain the pistil, which is succeeded with fruit; these are called fruitful or knitting flowers. The hermaphrodites are those which contain the organs of both sexes, *viz.* stamina and pistils; and these are by far the most numerous.

From the different figures and disposition of the flower-leaves of plants, Mr. Tournefort has established a system of botany; whereas that of Linnæus is chiefly founded on the number and disposition of the stamina. See BOTANY.

Flowers were in great request among the antients: they adorned their temples, houses, and even tombs with them; but their principal use seems to have been at entertainments, where the guests were always decked with flowers, and even the room strewed with them.

Quincy tells us, that flowers, designed for medicinal use, should be plucked when they are moderately blown, and on a clear day before noon: and that for conserves, roses must be taken in the bud.

For the method of preserving specimens of flowers, see HORTUS SICCUS.

FLOWER *of Bristol*, a plant more usually called lychnis. See LYCHNIS.

Gentle FLOWER, the same with amaranth. See the article AMARANTH.

Eternal FLOWER, the english name of the xeranthemum. See XERANTHEMUM.

Everlasting FLOWER, the english name of the gnaphalium. See GNAPHALIUM.

FLOWER-FENCE, the english name of the poinciana. See POINCIANA.

FLOWER DE LUCE, the same with the iris. See the article IRIS.

Sultan FLOWER, the same with the cyanus. See the article CYANUS.

Sun-FLOWER, the english name of the helianthus. See HELIANTHUS.

Trumpet-FLOWER, the same with the bignonia. See the article BIGNONIA.

Wind-FLOWER, the same with the anemone. See the article ANEMONE.

FLOWERS, in chemistry. See the article FLOS, *supra*.

FLOWER DE LIS, or FLOWER DE LUCE, in heraldry, a bearing representing the lilly, called the queen of flowers, and the true hieroglyphic of royal majesty; but of late it is become more common, being borne in some coats one, in others three, in others five, and in some semee, or spread all over the escutcheon in great numbers.

The arms of France are, three flower de lis or, in a field azure.

FLOWN-SHEETS, in the sea-language. A ship is said to sail with flown-sheets,

 when

when her sails are not haled home, or close to the blocks. *The sheets are flown*, that is, they are let loose, or run as far as they will.

FLOX, among dyers, signifies well cleaned wool, used to absorb the colours of cochineal.

FLUDDER, or FLUDER, a large bird of the colymbus or diver-kind, nearly allied to the lumme. See COLYMBUS and LUMME.

FLUELLIN, the english name of a plant called by botanists elatine. See the article ELATINE.

FLUENT, in fluxions, the flowing quantity, or that which is continually either increasing, or decreasing, whether line, surface, solid, &c. See FLUXION.

It is easy to find the fluxions, where the fluents are given; but, on the contrary, it is very difficult to find the fluents of given fluxions.

FLUID, in physiology, an appellation given to all bodies whose particles easily yield to the least partial pressure, or force impressed.

Some philosophers make the following distinction in fluids; those which flow or spread themselves till their surfaces become level or horizontal, they call liquid, in contradistinction to flame, smoke, vapour, &c. which are also fluids, but do not acquire such a surface. Those which are capable of exciting in us the idea of moistness, as water, &c. they call humid, distinguishing them thereby from air, quicksilver, and melted metals. But these distinctions are quite unnecessary in a philosophical sense; the surfaces of all fluids being level, or horizontal, when not prevented by the bodies about them: and humidity is only a relative quality; for though quicksilver will not moisten or stick to a man's finger, it will to silver or gold. See the article FLAME, SMOKE, LIQUID, &c.

The nature of a fluid, as distinguished from that of a solid, or hard body, consists in this, that its particles are so loosely connected together, that they readily move out of their places, when pressed with the least force one way more than another. From whence philosophers conclude, that these particles are exceedingly minute, smooth, and round, it being otherwise impossible they should move with such freedom upon the least inequality of pressure.

Those particles considered separately, are endowed with all the common properties of matter, and are subject to the same laws of motion and gravitation with lager bodies. To enquire, therefore, into the nature of fluids, is to consider what appearances a collection of very small round bodies, subject to these laws, will exhibit under different circumstances.

Laws and properties of FLUIDS. 1. All fluids are incompressible, except air; or, they cannot, by any force, be compressed into a less space than what they naturally possess, as is proved by the florentine experiment, of filling a globe of gold with water, which, when pressed with great force, causes the water to transude or issue through the pores of the gold, in form of a dew all over its surface. See the article AIR.

2. All fluids gravitate, or weigh in proportion to their quantity of matter, and that not only in the air, but *in proprio loco*: or, a fluid weighs the same, communicating with a quantity of that fluid, as *in vacuo*; which all philosophers, till very lately, have denied.

The reason was this, because philosophers found that a bucket of water, in water, weighed nothing; that is, that because there was no relative gravity in water, they very strangely inferred there was no absolute gravity in any part or particle of water, whilst it remained in water, but only became heavy when taken out or separated from the rest. But their mistake is easily evinced by the following experiment: let a bottle, or phial, with shot in it, to make it sink in water, when close stopped, be hung at the end of a nice balance, and then immersed into a jar of water: while thus hanging in water, let it be counterpoised very exactly by weights put into the scale at the other end; then, pulling out the cork, the water will rush into the bottle, and destroy the equilibrium, by causing the balance to descend; which will be a plain proof that water has weight in water.

That fluids gravitate, or are heavy, in the same manner with solids, is evident; because the earth's attraction, which is the cause of gravity, equally affects the particles of all sorts of matter, and therefore excites the same endeavour, or tendency towards the center of the earth, in the particles of a fluid, as in those of a solid body: and this is what we call absolute gravity. See the article GRAVITY.

Now since in fluids of the same kind as water, all the particles are reasonably supposed equal and alike in all circumstances,

ftances, they will be all equally affected by attraction, and therefore have, among themfelves, an equal tendency towards the earth's center; whence, fince they gravitate equally, if they are equally obftructed in their defcent (as by the bottoms of the veffels, *&c.*) they will all retain the fame pofition among themfelves, as if they were affected by no power at all; and thus they are faid to be relatively at reft, or in a ftate of quietus among themfelves; fince no one particle of the fame fluid has a greater fhare of attracting power than another, no one will tend to defcend before another; and therefore, among the particles of the fame fluid, there is no fuch thing as what we call relative or refidual gravity, which is nothing but the excefs of gravity, by which one body tends downwards more than another.

3. From the gravity of fluids arife their preffure, which is always proportional thereto: and fince we may fuppofe all the particles of a fluid to have equal bulk and weight, the gravity of the fluid, and confequently the preffure will be always proportional to the altitude or depth thereof: whence the weight and preffure of fluids on the bottoms of veffels, *&c.* muft be equal.

4. The preffure of fluids upwards is equal to the preffure downwards, at any given depth. To illuftrate this and the foregoing propofition, let A B C D (pl. C, fig. 1.) be a veffel of water, whofe altitude E F fuppofe to confift of a column of 10 aqueous particles; then, it is evident, the firft or uppermoft particle 1 can affect the next particle 2, only by its weight or preffure, which therefore is as 1; and fince that particle 2 is immoveable, and action and re-action equal and contrary, the faid particle 2 will re-act upwards upon the particle 1, with a force which is as 1. In the fame manner the particle 2 acts on the particle 3, by preffure downwards, with two degrees of force, arifing from its own weight and from that of the particle above it; and accordingly it is preffed upwards with an equal force by the re-action of the particle 3. And fo of all the reft, wherefore the propofitions are manifeft.

5. The preffure is upon all particles of the fluid, at the fame depth, equal in every part; or the particles of a fluid, at the fame depth, prefs each other, every way and in all directions, equally. For if any particle were preffed more on one part than another, it muft give way and yield, till the preffure become every way equal; otherwife an inceffant inteftine motion of the particles muft enfue, which is abfurd, and contrary to experience.

6. From the mutual preffure and equal action of the particles, it follows, that the furface of a fluid muft be perfectly fmooth and even; for fhould any part ftand higher than the reft, by any force, as attraction, *&c.* it would immediately fubfide to a level with the other part, by the force of its own gravity, when that force is removed.

7. The figure of the furface of all fluids is fpherical or convex; for all the particles equally gravitating towards the center of the earth, will take their places from it at equal diftances at the furface, and fo form a part of the fuperficies of a fphere, equal to the bulk of the earth.

Befides the reafon of the thing, we know from experiment, that the furface of large waters, as thofe of the fea or ocean, is convex; for a perfon ftanding on the fhore, and viewing a fhip under fail, directly before him, will lofe fight thereof by degrees, the hull or body of the fhip firft difappearing, then the lower parts of the maft, then the top of the lower mafts, and, laftly, the top of the talleft maft. This is more fully explained in determining the figure of the earth. See the article EARTH.

8. Since fluids prefs equally every way, the preffure of each particle againft the fide of a veffel will be proportional to its altitude, and confequently the preffures of the particles 1, 2, 3, 4, *&c.* of a perpendicular column againft the fide BC (*ib.* fig. 1.) will be a feries of numbers in arithmetical progreffion, whofe firft term is 0; therefore the fum of all the preffures is equal to the number of preffures multiplied by half the greateft preffure: but the number of preffures is as the number of particles, or altitude of the fluid BC; alfo the greateft preffure is as the fame altitude; wherefore the total preffure againft the fide of a veffel, is as the fquare of the altitude of the fluid. See the article PROGRESSION.

This way of confidering the quantity of lateral preffure, by the arithmetical feries, is univerfal; whereas the common method reftrains it to the property of an equicrural right-angled triangle, and to a veffel of a cubical form, which we

fhall

ſhall here give, for the ſake of proving it ſeveral ways: ſuppoſe A B C D (*ib.* fig. 1.) a veſſel of a cubical form, that is, whoſe ſide B C is equal to the length of the bottom C D. If the diagonal B D be drawn, we ſhall have the lines 1 *a* = B 1, 2 *b* = B 2, 3 *c* = B 3, 4 *d* = B 4, *&c.* But B 1, B 2, B 3, B 4, *&c.* being as the altitudes of the fluid, will repreſent the lateral preſſures in the points 1, 2, 3, 4, *&c.* therefore alſo the lines *a* 1, *b* 2, *c* 3, *d* 4, *&c.* will repreſent the ſame lateral preſſures; hence when the diſtances B 1, 12, 23, *&c.* are indefinitely ſmall, the lines *a* 1, *b* 2, *c* 3, *d* 4, *&c.* will be infinitely near each other; and ſo all thoſe lines drawn in the triangle B C D, will make the area of that triangle: therefore the ſum of all the lateral preſſure againſt the ſide B C, will be as the area of that triangle. But the area of the triangle B C D is as the ſquare of the ſide B C; conſequently the ſum of all the lateral preſſures is as the ſquare of the altitude of the fluid B C.

9. Hence, if the veſſel A C (*ib.* fig. 1.) be of a cubical form, the preſſure againſt a ſide B C, is half that upon the bottom C D, and conſequently the total preſſure againſt the ſides and bottom is equal to three times the weight of the fluid on the bottom of ſuch a veſſel.

10. The weight, preſſure, or effect of a fluid, upon the bottom D E (*ib.* fig. 2.) of any veſſel A C D E F, is proportional to the altitude A E only, and not to the quantity of the fluid in the veſſel. For every column of particles G H, which preſſes downwards on the ſide of the veſſel E F, has its force deſtroyed by the equal re action of the ſubjacent particle H in the ſide, and ſo cannot at all affect the bottom of the veſſel. Again, the preſſure of any column of particles L M upwards, againſt the ſide of any veſſel C D, is equally re-acted by the particle of the veſſel over it, and ſo its force or preſſure on the bottom muſt be the ſame as that of another column of particles A B of equal altitude with the fluid: whence the propoſition is evident.

11. Hence a very ſmall quantity of fluid A P R S (*ib.* 2.) may be made to counterballance, or be equivalent to the weight or force of any given quantity T K G V, how great ſoever.

12. When any body is immerſed in a fluid, it loſes juſt ſo much of its weight as is equal to the weight of an equal bulk of the fluid; but the weight loſt by the body is gained by the fluid, which will be ſo much heavier than before.

This is the fundamental principle of every hydroſtatic proceſs, particularly of the whole doctrine of ſpecific gravities, which therefore cannot be made too plain and eaſy to be underſtood.

To this end, let A B C D, (fig. 3.) be a veſſel filled with water, to the height E F; and let I be a cylindric body, heavier than water, to be immerſed therein, as at L. By this immerſion of the body I, a quantity of the fluid *a b c d*, equal in bulk to the body, will be diſplaced by the ſuperior force, or greater gravity of the ſolid; and this quantity of fluid muſt aſcend, as being confined towards the bottom and ſides; and ſo riſe the ſurface of the liquor from E F to G H, and then will the quantity E F G H be equal to the bulk of the immerſed ſolid *a b c d*. But as the ſolid comes to enter the fluid, each particle of the fluid, by its vis inertiæ, will reſiſt the ſolid, or endeavour to oppoſe its deſcent with all its power; and ſo the whole body of the fluid, that is removed or diſplaced by the ſolid, will reſiſt by the united force of all the particles: but this force is equal to the gravity of the fluid removed, as is evident from hence, that the fluid ſo removed is obliged to aſcend or move in a direction quite contrary to gravity, wherefore the ſolid in its deſcent will be reſiſted by a force equal to the gravity of an equal bulk of the fluid.

And ſince the force which reſiſts the deſcent of ſolids is proportioned to their bulk only, it follows, that equal bodies immerſed in fluids, loſe equal parts of their weights; and therefore, a lighter body loſes more of its abſolute weight than a heavier one of the ſame bulk; and conſequently if two bodies of unequal bulk are in equilibrio in the air, that equilibrium will be deſtroyed on their being immerſed in the fluid, becauſe that which has the largeſt bulk will loſe moſt weight in the fluid.

Again, it is plain, the weight of the fluid is augmented in the ſame proportion as that of the immerſed ſolid is diminiſhed; for the force or action of the fluid, on the bottom of the veſſel C D, is before immerſion to that afterwards, as the altitudes C F to C H; or to the bulks of the fluid E F C D and G H C D. And ſince thoſe bulks act only by their gravity, 'tis plain the action of the fluid is encreaſed

creafed only by the additional gravity of the quantity G H F E, which is equal to that which the folid lofes by immerfion. See the article GRAVITY.

13. If any body E (fig. 4.) could be found without weight, it would, if placed on the furface of a fluid A B, float thereon, without any part immerfed; for being devoid of gravity, it could have no force to difplace any particles of the fluid, and fink therein.

14. If an heavy body F, (n° 4.) lighter than an equal bulk of the fluid, be placed on its furface, it will fink, or defcend therein till it has removed or difplaced fo much of the fluid whofe weight is equal to that of the body. For then the preffure upwards and downwards on the furface of the body is equal, and confequently the body will be there quiefcent, or in equilibrio with the fluid. Hence the whole folid is to the immerfed part as the fpecific gravity of the fluid is to that of the folid. See the article HYDROSTATIC BALLANCE.

This cafe is not ftrictly true, but in vacuo; for in the air fuch a body may be confidered as fuftained by two mediums, *viz.* air and water, in one of which it will fink, or defcend; and in the other, rife.

15. If a folid, as G, (n° 4.) equal in weight to an equal bulk of the fluid, be immerfed therein, it will take any fituation indifferently in any part of the fluid, as at G, H, I, without any tendency to afcend or defcend therein; for being totally immerfed, it muft remove a parcel of the fluid of equal bulk and weight, and confequently the preffure upwards is equal to the tendency downwards, on the lower furface, every where; and therefore it can have no power to fink. Alfo the preffure downwards muft be equal to the preffure upwards, on the upper furface, whence it can have no tendency to rife or fwim: it will therefore remain at reft in any pofition G, H, I, wherefoever in the fluid.

16. Laftly, if a body K, or L, (fig. 4.) heavier than an equal bulk of the fluid, be immerfed therein, it will defcend by the excefs of its gravity above that of the fluid; for when immerfed, it will be refifted by the force of an equal bulk of the fluid, which therefore will deftroy fo much of the gravity of the folid; and confequently the refidue, or excefs of gravity in the folid, is that alone by which it muft defcend.

This relative gravity of folids, by which they fink or fwim, is ufually illuftrated by the defcent and afcent of glafs images, and bubbles included in a jar of water, covered over with a bladder, fo as to include a fmall quantity of air between the bladder and water: the images, &c. have fmall holes in the bottom of their feet thro' which fome water is put into their bodies, and that in fuch quantities as will render them but very little fpecifically lighter than water; but fome more fo than others, that they may not begin to move all together. See the reprefentation in fig. 5. The images being thus put to float in water, and the bladder tied down, if the hand be laid on the bladder, and gently compreffes the air beneath, the air, by its fpring, will act upon the water, and caufe it to comprefs the air in the bodies of the images, by which means more water will be driven into their bodies; and when fo much is got in as will make them fpecifically heavier than the water, then they will begin to defcend one after another; and by varying the degree of preffure, you may keep them fufpended in any part of the fluid as you pleafe.

From what has been premifed of the nature of fluids, it will be eafy to underftand, that the lighteft body, P, (plate *ibid.* fig. 4.) may be depreffed in the heavieft fluid by any contrivance to keep the faid fluid from preffing on the under furface of the light body, by which means only light bodies are made to fwim. Thus cork, or wood, will abide at the bottom of a veffel filled with quickfilver.

Again: on the other hand, the heavieft body M may be made to fwim in the lighteft fluid, by keeping the faid fluid from preffing on its upper furface, by means of the tube N O. For when by this means it is immerfed fo deep as to keep off an equal weight of the fluid, the preffure then of the fluid acting upon its under furface upwards, will be equal to the weight of the folid tending downwards; and therefore, if the folid be funk ever fo little deeper, it muft fwim by the fuperior force or preffure of the fluid upwards.

Thus, for inftance, if the body M be five times heavier than water of an equal bulk, and if by means of the tube N O, placed on its upper furface, the water be kept from preffing thereon, that it be immerfed to feven times its thicknefs below

low the ſurface of the water, 'tis plain the preſſure on the under ſurface will be as ſeven, but downwards only as five; and therefore, ſince there is the exceſs of two degrees of preſſure upwards, 'tis plain the body cannot deſcend; but may very properly be ſaid to ſwim on the water. Hence alſo the reaſon of trying the different gravity, denſity, or ſtrength of divers fluids, or ſpirituous liquors, by the hydrometer, or water-poiſe. See the article HYDROMETER.

Motion of FLUIDS. The motion of fluids, *viz.* their deſcent or riſe below or above the common ſurface or level of the ſource or fountain, is cauſed either, 1. by the natural gravity or preſſure of the fluid contained in the reſervoir, or fountain; or, 2. by the preſſure or weight of the air on the ſurface of the fluid in the reſervoir, when it is at the ſame time either taken off or diminiſhed on ſome part in aqueducts, or pipes of conduit. 3. By the ſpring, or elaſtic power of compreſſed or condenſed air, as in the common water engine. 4. By the force of piſtons, as in all kinds of forcing pumps, &c. 5. By the power of attraction, as in the caſe of tides, &c.

1. The moſt natural motion of fluids is that ariſing from the force of their own gravity, by which thoſe parts which ſtand higheſt preſs upon others below them, till by that means they riſe to the ſame horizontal level. Thus water in a fountain A B C D (fig. 6.) by its preſſure, raiſes that in the aqueduct F G H to the ſame height I K L M in every direction or poſition of the duct G H, or G N; unleſs the orifice of the ſaid duct be below that level, in which caſe the water will continually flow from the ſame. The reaſon hereof is evident from the principles already laid down, *viz.* that the preſſure of fluids was in proportion to the altitude only, and not according to the quantity thereof, and therefore the effect or riſe of the fluid in the duct muſt be equal thereto.

Hence we have conduits often ſupplied with water from ſprings, which lie above them; and cocks to ſupply the inhabitants of a town with water by pipes from a reſervoir, in a ſituation above the higheſt part of the town: hence alſo the deſcent of water in rivers, ſtreams, and canals from ſprings and ſources above the common ſurface of the earth; and the breaking out of ſprings at the bottoms and on the ſide of hills; from ciſterns and reſervoirs in the internal parts above them, which receive their water from rain, dew, condenſed vapour, melted ſnow, &c. diſtilling, or percolated through the pores or crevices and chaſms of the upper part of the earth. See the articles FOUNTAIN, SIPHON, CONDUIT, TANTALUS's CUP, JET D'EAU, RESERVOIR, CANAL, SPRING, CISTERN, &c.

2. The ſecond cauſe of the riſe or motion of fluids is the preſſure of the air on the ſurface of that in the fountain or reſervoir: thus if a ſyphon or crane be immerſed with the ſhorter leg in water, and the air ſucked out of the inſtrument, the fluid will aſcend into the vacuous ſpace by the preſſure of the air on the water, and fill the whole cavity of the tube; and becauſe there is a greater column of water in the longeſt leg, it will preponderate and deſcend thro' it, and will keep flowing out till the veſſel is exhauſted to the orifice of the ſhorter leg. The effect of the common pump is from the ſame principle. See the article PUMP.

3. The third cauſe of the riſe and motion of fluids is by the ſpring or elaſtic power of condenſed air, upon which principle water engines are contrived. See the article ENGINE.

4. The fourth cauſe is the force or preſſure of piſtons, upon which principle a variety of water engines are conſtructed, as may be ſeen under the articles already referred to.

5. The laſt cauſe of the motion of fluids which we mentioned was that of attraction. We have elſewhere ſhewn how by this means any fluid will aſcend above the common ſurface in capillary tubes, &c. See the article CAPILLARY.

But the moſt notable and obvious motion of fluids ariſing from attraction, is that of the tides; the waters of the immenſe ocean, forgetful, as it were, of their natural quietus, move and roll in ſwelling tides obſequious to the ſovereign power of the moon, and weaker influence of the ſun. See the article TIDES.

Momenta and velocities of FLUIDS. The momenta of fluids, as well as of ſolids, are compounded of the quantity of matter and velocity; but in ſpouting fluids, the quantity of the fluid iſſuing thro' the ſame hole, in the ſame time, is always as the celerity of its motion, as is eaſy to conceive. Whence the momenta of ſpouting fluids are proportional to the ſquares of the velocities,

cities, or quantities of matter iſſuing out in a given time. But ſince the momenta are the effect of preſſure, it is evident the velocity or quantity of ſpouting fluids is ever proportional to the ſquare root of the preſſure, or altitude of the fluid. From hence it appears, that the velocity of a fluid ſpouting at any depth below the ſurface is equal to the velocity a heavy body would acquire by falling from the ſame height; becauſe the velocity, as was obſerved, is always as the ſquare root of the ſpace deſcended through. If therefore on the altitude of the fluid A K, (fig. 7.) as a diameter, we deſcribe the ſemicircle A F K, and from any point therein, as I, we draw the perpendicular I H, that ſhall be proportional to the diſtance to which the fluid will ſpout from an adjutage at H: for the velocity will be, as the ſquare root of A H; and the time, as the ſquare root of H K; whence the product of theſe two will expreſs both the ſpace paſſed over by the projected body, and alſo the line H I.

Hence it follows, that a fluid will ſpout from a hole or adjutage D, in the center of the ſemicircle, or middle part of the altitude A K, to the greateſt horizontal diſtance K M poſſible; becauſe the perpendicular F D is the greateſt that can be drawn to the diameter A K. Alſo it is evident, that from two holes B and H, equally diſtant above and below the middle altitude D, the jets of water will be made to the ſame horizontal diſtance K N; becauſe the perpendiculars to theſe two points, *viz.* C B and I H, are equal. Moreover, the horizontal diſtance K M, to which the water ſpouts from D the center, is equal to the diameter or altitude A K, or twice D F. For ſince the velocity of the jet at Q is equal to that acquired by falling through the height A D, or D K, it will, as being uniform, carry the fluid in an horizontal direction over twice the ſpace D K or D F in the ſame time. And therefore, ſince the diſtances of jets from D and B are as D F to B C, and the diſtance of the jet from D is equal to twice D F, the diſtance of the jet from B will be alſo equal to twice B C, or K N = 2 B C.

From what has been ſaid, it is eaſy to obſerve, that the motion of a ſpouting fluid is every way ſimilar to that of a projected ſolid. The path of the fluid is a parabola, becauſe it is impelled by two forces, one horizontal, the other of gravity in the perpendicular, in the ſame manner as in the projected ſolid. See the article PROJECTILE.

The impetus of the jets B, D, H, E, is as the height of the reſervoir A B, A D, A H, A E; the greateſt horizontal random K M, is that from the jet D, directed to the middle point F of the ſemi-circle; and any two jets equally diſtant as B, H, go to the ſame diſtance K N on the horizon. If the adjutage be horizontal, the jet will be a ſemi-parabola; if oblique, it will be a whole parabola. See the article PARABOLA.

FLUKE, in ichthyology. See FLOUNDER.

FLUKE *of an anchor*. See ANCHOR.

FLUMMERY, a wholeſome ſort of jelly made of oat-meal.

The manner of preparing it is as follows. Put three large handfuls of finely ground oat-meal to ſteep, for twenty-four hours, in two quarts of fair water: then pour off the clear water, and put two quarts of freſh water to it: ſtrain it through a fine hair ſieve, putting in two ſpoonfuls of orange flower-water, and a ſpoonful of ſugar: boil it till it is as thick as a haſty pudding, ſtirring it continually while it is boiling, that it may be very ſmooth.

FLUOR, in phyſics, a fluid, or more properly, the ſtate of a body that was before hard or ſolid, but is now reduced by fuſion, or fire, into a ſtate of fluidity.

FLUOR, in mineralogy, implies a ſort of mineral concretion, frequently found amongſt ores and ſtones, in mines and quarries.

FLUOR ALBUS, or WHITES, in medicine, an efflux of a whitiſh, lymphatic, ſerous, or aqueous humour, from the matrix. It is ſometimes white, ſometimes pale, yellow, green, or blackiſh. Sometimes it is ſharp and corroſive, ſometimes foul and fetid; the face is diſcoloured, there is a pain in the ſpine of the back, the appetite is loſt, and the eyes and feet ſwell. Some women have a periodical flux of the whites, inſtead of the menſes. There are remarkable diſtinctions in this diſorder, as the lacteous, the ſemi-lacteous, and lymphatic: it may be ſo acrid or cauſtic, as to excoriate the vulva. Beſides the ſymptoms already mentioned, it is attended with a ſwelling of the uterus; turbid urine; a loathing of ſome things, and longing for others; a ſlow fever; dropſies of different parts, of which, or a conſumption, the patient dies. It may be confounded with an ulcer of the uterus, or a gonorrhœa muliebris. See the article GONORRHOEA.

The fluor albus ſometimes is diſcharged from

from the uterine veſſels, and ſometimes from the glands of the vagina. In the firſt caſe it ſtops when the menſes begin to flow; in the latter it continues with them; and pregnant women are not exempted from it. At firſt the parts of the membranæ adipoſæ of the loins, kidneys, and the uterine appendages, are waſted by it: but at length the flux becomes acrimonious. When the flux is lacteous, it may be cured in fifteen days; the patient muſt feed ſparingly, uſe frequent exerciſe, and ſleep little. If this is not complied with, ſhe muſt bleed in the arm, once or twice a month, and take purges and emetics; or, at leaſt, frequent clyſters. The efficacy of all theſe muſt be aſſiſted with diaphoretics, decoctions of the woods, and diuretics. In the ſemilacteous flux, an inſpiſſating and nouriſhing diet will be beſt, ſuch as creams, ſoups, boiled milk, roaſt meat, jellies, *&c.* Milk, or milk turned with a decoction of china, is very good. Narcotics are highly uſeful, eſpecially if the patient is reſtleſs, or delirious. In the beginning, the doſe muſt be ſmall, but it may be gradually encreaſed. When the veſiculæ lacteæ are relaxed, the tone muſt be reſtored with hot mineral baths, and fomentations; and injections of, and bathing in the ſame: the fumes may alſo be conveyed into the vagina with a funnel. Decoctions of the woods are alſo good; as are diaphoretics, and diuretics of a decoction of roots of eryngo and reſt-harrow, with powder of millepedes, or glauber's ſalt.

If the lymphatic flux is attended with a ſcrophulous, ſcorbutic, or venereal taint, theſe diſorders muſt firſt be removed. If the uterine lymphatics are compreſſed by ſchirroſities, cancers, ganglions, or the like, regard muſt be had to the cauſes.

In obſtructions of the glands of the uterus, begin with bleeding: then a gentle purge, or an emetic of iij gr. of tartar-emetic, or ipecacuanha: afterwards, if the patient's conſtitution is cold, attenuating aperients. If ſhe is hot and bilous, with a ſenſible pain in the uterus, cooling broths and apozems, with the addition of cray-fiſh; aſſes milk, with a decoction of barley; chalybeate whey, with chervil boiled therein; gently purging mineral waters; baths and half baths are convenient in the ſummer.

FLUSH-DECK, in a ſhip. See DECK.

FLUSHER, in ornithology, a bird otherwiſe called the lanius minor, or leſſer butcher-bird. See the article LANIUS.

FLUSHING, or VLISSENGEN, a port town of Zealand, in Holland, five miles ſouth of Middleburg: eaſt long. 3° 25′, north lat. 51° 30′.

It is a town of great foreign trade, and has a good ſecure harbour.

FLUTE, *fiſtula*, an inſtrument of muſic, the ſimpleſt of all thoſe of the wind kind. It is played on by blowing it with the mouth, and the tones or notes are changed by ſtopping and opening the holes diſpoſed for that purpoſe along its ſide. The antient fiſtulæ, or flutes, were made of reeds, afterwards of wood, and laſt of metal: but how they were blown, whether as our flutes, or as hautboys, does not appear.

'Tis plain ſome had holes, which, at firſt, were but few, but afterwards increaſed to a great number, and ſome had none; ſome had ſingle pipes, and ſome a combination of many, particularly Pan's ſyringa, which conſiſted of ſeven reeds joined together ſideways.

German FLUTE, is an inſtrument intirely different from the common flute. It is not, like that, put into the mouth to be played, but the end is ſtopt with a tampion, or plug; and the lower lip is applied to a hole about two inches and a half, or three inches, diſtant from the end. This inſtrument is uſually about a foot and a half long; rather bigger at the upper end than the lower; and perforated with holes, beſides that for the mouth, the loweſt of which is ſtopt and opened by the little finger's preſſing on a braſs, or ſometimes, a ſilver key, like thoſe in hautboys, baſſoons, *&c.* Its ſound is exceeding ſweet and agreeable; and ſerves as a treble in a concert.

Coarſe flutes, on importation, pay the gros, containing twelve dozen, 3s. $10\frac{20}{100}$d. and on exportation draw back 3 s. $4\frac{50}{100}$ d.

FLUTE, or FLUYT, is alſo a kind of long veſſel, with flat ribs, or floor timbers; round behind, and ſwelled in the middle; ſerving chiefly for the carrying of proviſions in fleets, or ſquadrons of ſhips, though it is alſo uſed for merchandize.

FLUTES, or FLUTINGS, in architecture, perpendicular channels, or cavities, cut along the ſhaft of a column, or pilaſter. They are chiefly affected in the ionic order, where they had their firſt riſe; though,

though, indeed, they are uſed all in the richer orders, as the corinthian and compoſite; but ſeldom in the doric, and ſcarce ever in the tuſcan.

Each column has twenty-four flutes, and each flute is hollowed in exactly a quadrant of a circle: but the doric has but twenty. Between the flutes are little ſpaces that ſeparate them, which Vitruvius calls *ſtria*, and we liſts: though, in the doric, the flutes are frequently made to join to one another, without any intermediate ſpace at all; the liſt being ſharpened off to a thin edge, which forms a part of each flute. See LIST.

Vignola determines the depth of the flutes by taking the angle of the equilateral triangle for the center. Vitruvius deſcribes the depth from the middle of the ſquare, whoſe ſide is the breadth of the flute, which latter method makes them deep. Some columns have flutes that go winding round the ſhaft, ſpirally; but this is rather accounted an abuſe. The flutes, or ſtriæ, are commonly filled up with a prominent or ſwelling ornament; ſometimes plain, in form of a ſtaff or reed; and ſometimes a little curved, or enriched, in imitation of a rope, or otherwiſe. See the article CABLED.

Sometimes the flutings are made flat, and are called facettes: but theſe have never ſuch a good effect as the others. Vitruvius ſays, that when there are flutings in the column, there ought alſo to be eggs and anchors in the quarter round of the capital, and even pearls and olives, in a baguette, to be made underneath, inſtead of annulets. Theſe eggs and olives ought to be in the ſame number with the flutings, and to be regularly diſtributed.

FLUX, in medicine, an extraordinary iſſue, or evacuation of ſome humours of the body.

Sometimes it is taken for all kinds of defluxions; in which ſenſe it is the ſame with a catarrh, or coryza. See the article CATARRH.

Sometimes it ſignifies a looſeneſs, or flux, of the belly, which is of four kinds. When the food is diſcharged by ſtool undigeſted, it is called a lientery, or lienteric flux. When the chyle is diſcharged, it is called cœliaca. When excrementitious humours are diſcharged, as choler, phlegm, &c. it is called ſimply a diarrhœa; and when the ſtools are bloody, it is called a dyſentery, or bloody-flux. See the articles LIENTERY, COELIAC PASSION, DIARRHOEA, and DYSENTERY.

Again, there is an hepatic flux: but this is ſuppoſed to be no other than the hæmorrhoidal flux. See the article HÆMORRHOIDS.

FLUX of the urine. See the article DIABETES.

Women are ſubject to three ſeveral kinds of fluxes extraordinary; the firſt, called the menſes, or menſtrual flux; the ſecond is after delivery, and is called lochia: theſe are regular and natural. See the articles MENSES and LOCHIA.

The third, being irregular and preternatural, is termed the fluor-albus, or whites. See FLUOR ALBUS.

FLUX, in hydrography. See TIDE.

FLUX, in metallurgy, whatever can cauſe a body otherwiſe not at all, or hardly, fuſible by fire, to melt.

Fluxes, ſays Dr. Shaw, ſeem reducible to two general kinds, *viz.* the vitreous and the ſaline. By the vitreous we underſtand all thoſe which either have of themſelves, or readily aſſume, a glaſſy form in the fire; among the principal whereof are reckoned the glaſs of lead, the glaſs of antimony and borax. By the ſaline kind of fluxes are underſtood all thoſe that are compoſed of ſalts, whether tartar, nitre, fixed alkali, or the like. Among the principal of this kind we reckon the black flux, ſandiver, kelp, &c. See the articles SANDIVER and KELP.

The method of making the black flux is as follows. Take one part nitre, and two parts common tartar, and reducing each to powder, mix them together: deflagrate the whole in a crucible, by lighting the mixture a-top, which thus turns to a kind of alkaline coal, that is to be pulverized and kept cloſe in a glaſs, to prevent its diſſolving, as it would do in a moiſt air.

The vitreous kind of fluxes ſeem more immediately deſtined to act upon the ſtony or vitreſcible matter, wherewith ſtubborn ores are frequently mixed, and the ſaline kind to act more immediately upon the ore itſelf, for the due excluſion or ſeparation of the metal. The more kindly ores require no flux to make them run thin, or to afford all the metal they contain, and ſometimes ores are ſo kindly as to contain their own fluxes within themſelves. Thus, we have met with copper-ores, which being barely ground to powder, and melted without any addi-

addition in a common wind-furface, have yielded as much, or even more, pure metal at the firſt operation, than could be obtained from them by means of the uſual fluxes. Whence we ſee that artificial fluxes are not always neceſſary; or that the principal uſe of them is for the ſtubborn or leſs tractable ores; and theſe are ſometimes ſo exceedingly hard to fuſe and reduce to a metalline form, that it requires the utmoſt power of art to treat them advantageouſly in the larger way of buſineſs, where no conſiderable expence can uſually be allowed for fluxes. And on this account it is, that many mines remain unwrought, as being untractable without great charges. Whence the improvement of the buſineſs of fluxes, ſo as to render them cheap and effectual, might greatly contribute to the improvement of metallurgy. The matter in ſoft ores, which renders them ſo fuſible, has been found by an experiment upon copper-ore, to be a kind of bituminous ſubſtance, capable of melting by a ſtrong heat, into a ſoft and black kind of glaſs.

Some of the moſt powerful and cheap ſimple fluxes hitherto known, are dried wine-lees, dried cow-dung and horſe-dung, dried river-mud, fuller's earth, iron-filings, common ſalt, glaſs, kelp, or pot-aſhes, ſandiver, &c. which may be uſed in the larger work; as nitre, tartar, borax, ſal ammoniac, mercury ſublimate, &c. may in the ſmaller, or for the making of aſſays.

As for compound fluxes, they are numerous; almoſt every operator having his favourite flux. And, certainly, ſome fluxes are better adapted than others to certain ores. But perhaps a few general ones might be fixed upon, which ſhould ſerve inſtead of all thoſe hitherto commonly known and uſed: we will here recommend three, which are powerful, almoſt general, and not expenſive.

1. Take of nitre, prepared by long boiling it in lime-water; of ſea-ſalt, melted in the fire; ſandiver; and dry wine-lees, each one part; glaſs of lead, three parts; and powdered glaſs, eight parts; mix them all well together. This flux added in an equal weight, will fuſe a very ſtubborn ore.

2. For a ſtill ſtronger, take equal parts of white tartar, common ſalt and nitre, prepared as above: calcine them to a white powder; and mix therewith its own weight of glaſs and lead; and of this flux add two parts to one of the moſt ſtubborn ore.

3. For a powerful ſaline flux. Take of the ſtrongeſt ſoap-boiler's lees, four pounds; white tartar and common ſalt melted in the fire, each one pound: boil them together with five gallons of human urine, to a dry ſalt. This flux is particularly proper where ſulphur and cobalt abound, and render the ore very refractory.

But the great ſecret, in making and adapting fluxes, is not only to ſeparate the metal already ripened in the ore, but even to mature and ripen the crude and immature part of the ore in the fire: ſomething of this kind, we apprehend, may be effected, as having reaſon to believe, that certain fluxes will obtain a larger yield of metal from certain ores, than other fluxes, in common uſe, though eſteemed of the beſt, and though they are perhaps of the deareſt kind. Thus clean iron filings will often do more than borax. But as the ſcales and crocus, or ruſt, of iron, have been commonly uſed, inſtead of pure and perfect iron itſelf, for a flux, few operators appear acquainted with the excellence of perfect iron employed for this purpoſe. And many advantages are now obtained, by a prudent mixing of one ore with another of the ſame denomination, and with the ſlags, or recrements of metals, in this way of flux.

The melting of gold and ſilver, and of their calxes, is greatly promoted by glaſs of lead, alkaline ſalts, &c. but when gold and ſilver, in the fuſion itſelf, are to be purged from other metals and ſemimetals, it is proper to uſe nitre only; or if not ſo, nitre always muſt be mixed with the other ſalts; for the ſemimetals and the four leſs perfect metals are deſtroyed by nitre.

In this operation, nitre, by its detonation with their ſulphurs, is in part alkaliſed, and, by the help of a gentle fire, turns their calxes into a vitreous and much attenuated ſcoriæ.

From hence, the reaſon is plain why gold and ſilver, when made brittle, are readily reſtored to their malleability by nitre; for the ſame metals, and among the metals lead and tin moſt of all, communicate this fault to gold and ſilver; but theſe being changed, as before obſerved, by nitre, and then rejected by gold and ſilver in a ſimple fuſion, ſo that they can no longer mix with theſe metals,

unleſs

unless they are themselves first again reduced to their metallic state; and there is beside these, no other body that can be mixed with silver and gold, to render them brittle, unless crude charcoal, happening to fall into the vessel wherein these metals are melted, should impregnate them with something arsenical; there being some arsenic contained in coals of this kind, as has been demonstrated by Stahl and Hoffman.

The less perfect metals, and semi-metals, melt more easily by adding salts to them, than of themselves: they always, however, lose a great deal of their substance by this means; and this is more particularly the case in regard to copper and iron. To amend this, it is necessary to add some kind of fat body, which prevents the destruction, and even reduces the metals already destroyed; and this is more necessary when the calxes, prepared either by burning, or by a detonation with nitre, are to be reduced.

A caution, very necessary to be observed, is, that all fluxes must be kept and used very dry, for moist salts foam very much; and when the operations are made in close vessels, if the fire is quickly increased, not being able to get rid of the moisture, the vessels will split and break.

Fluxes being greatly attenuated, though confined in close vessels, part with their oily principle, and their alkaline salt remaining, begin to corrode and consume the vessels, of what matter soever they are made, and finally make their way through them, and get out. The first of these accidents is prevented by adding coal-dust, which will never part with its oil without the help of a free air; and the others by an admixture of common glass, made of a due mixture of flints, and fixed alkali; for this is sufficiently fusible, and melts with the fluxes; and by its viscidity in some sort coagulates and holds the salt of the flux together, and prevents it from easily corroding the vessels.

FLUXION, in mathematics, denotes the velocity by which the fluents or flowing quantities increase or decrease; and may be considered as positive or negative, according as it relates to an increment or decrement.

The doctrine of fluxions, first invented by Sir Isaac Newton, is of great use in the investigation of curves, and in the discovery of the quadratures of curvilinear spaces, and their rectifications. In this method, magnitudes are conceived to be generated by motion, and the velocity of the generating motion is the fluxion of the magnitude. Thus, the velocity of the point that describes a line, is its fluxion, and measures its increase or decrease. When the motion of this point is uniform, its fluxion or velocity is constant, and may be measured by the space described in a given time. But when the motion varies, the fluxion or velocity at any given point is measured by the space that would be described in a given time, if the motion was to be continued uniformly from that term.

Thus, let the point m be conceived to

A m m r
R

move from A, and generate the variable right line Am, by a motion any how regulated; and let its velocity, when it arrives at any proposed position or point R, be such as would, was it to continue uniform from that point, be sufficient to describe the line Rr, in the given time allotted for the fluxion, then will Rr be the fluxion of the variable line Am, in the term or point R. See the articles MOTION and VELOCITY.

The fluxion of a plain surface is conceived in like manner, by supposing a given right line mn (plate XCVIII. fig. 6. nº 1.) to move parallel to itself, in the plane of the parallel and moveable lines A F and B G: for if, as above, R r be taken to express the fluxion of the line Am, and the rectangle Rrs S be completed; then that rectangle, being the space which would be uniformly described by the generating line mn, in the time that Am would be uniformly increased by mr, is therefore the fluxion of the generated rectangle Bm, in that position.

If the length of the generating line mn continually varies, the fluxion of the area will still be expounded by a rectangle under that line, and the fluxion of the abscis or base: for let the curvilinear space Anm (*ibid.* nº 2.) be generated by the continual and parallel motion of the variable line mn; and let Rr be the fluxion of the base or abscis Am, as before, then the rectangle RrsS, will be the fluxion of the generated space Amn. Because, if the length and velocity of the generating line mn were to continue invariable

variable from the pofition R S, the rectangle $Rrs S$ would then be uniformly generated with the very velocity wherewith it begins to be generated, or with which the fpace Amn is increafed in that pofition.

Notation of FLUXIONS. Invariable quantities, or thofe which neither increafe nor decreafe, are reprefented by the firft letters of the alphabet, as a, b, c, d, *&c.* and the variable or flowing quantities by the laft letters, as v, w, x, y, z: thus, the diameter of a given circle may be denoted by a; and the fine of any arch thereof, confidered as variable, by x. The fluxion of a quantity reprefented by a fingle letter, is expreffed by the fame letter with a dot or full point over it: thus, the fluxion of x is reprefented by $\dot{x}$, and that of y by $\dot{y}$. And, becaufe thefe fluxions are themfelves often variable quantities, the velocities with which they either increafe or decreafe, are the fluxions of the former fluxions, which may be called fecond fluxions, and are denoted by the fame letters with two dots over them, as $\ddot{x}, \ddot{y}$. In the fame manner the fluxions of fecond fluxions are called third fluxions, and denoted by the fame letters with three dots over them, as $\dddot{x}$, $\dddot{y}$; and fo on for fourth, fifth, *&c.* fluxions, which are expreffed by the fame letters, with four, five, *&c.* dots over them, as $\ddddot{x}$, $\ddddot{y}$; and $\overset{\cdot\cdot\cdot\cdot\cdot}{x}$, $\overset{\cdot\cdot\cdot\cdot\cdot}{y}$, *&c.* If the flowing quantity be a fraction, as $\frac{xx}{d-y}$, its firft, fecond, third, *&c.* fluxions are expreffed by one, two, three, *&c.* dots placed in the break of the line that feparates the numerator from the denominator, thus $\frac{xx}{d\dot{-}y}$, $\frac{xx}{d\ddot{-}y}$, $\frac{xx}{d\dddot{-}y}$, *&c.*

The fluxions of furds denoted in the fame manner, by one, two, or more dots placed in the break of the vinculum of the radical character: thus, if the furd quantity be $\sqrt{x-y}$, then will its firft, fecond, third, *&c.* fluxions be $\sqrt{x\dot{-}y}$, $\sqrt{x\ddot{-}y}$, $\sqrt{x\dddot{-}y}$, *&c.*

The whole doctrine of fluxions confifts in folving the two following problems, *viz.* From the fluent, or variable flowing quantity given, to find the fluxion; which conftitutes what is called the direct method of fluxions. 2. From the fluxion given, to find the fluent, or flowing quantity; which makes the inverfe method of fluxions.

Direct method of FLUXIONS. The doctrine of this part of fluxions is comprized in thefe rules.

1. To find the fluxion of any fimple variable quantity, the rule is to place a dot over it: thus, the fluxion of x is $\dot{x}$, and of y, $\dot{y}$. Again, the fluxion of the compound quantity $x+y$, is $\dot{x}+\dot{y}$; alfo the fluxion of $x-y$, is $\dot{x}-\dot{y}$.

2. To find the fluxion of any given power of a variable quantity, multiply the fluxion of the root by the exponent of the power, and the product by that power of the fame root, whofe exponent is lefs by unity than the given exponent. This rule is expreffed more briefly, in algebraical characters, by $nx^{n-1}\dot{x}=$ the fluxion of x^n. Thus, the fluxion of x^3 is $\dot{x}\times 3\times x^2=3x^2\dot{x}$; and the fluxion of x^5 is $\dot{x}\times 5\times x^4=5x^4\dot{x}$. In the fame manner the fluxion of $\overline{a+y}|^7$ is $7\dot{y}\times\overline{a+y}|^6$; for the quantity a being conftant, $\dot{y}$ is the true fluxion of the root $a+y$. Again, the fluxion of $\overline{a^2+z^2}|^{\frac{3}{2}}$ will be $\frac{3}{2}\times 2z\dot{z}\times\overline{a^2+z^2}|^{\frac{1}{2}}$: for here, x being put $=a^2+z^2$, we have $\dot{x}=2z\dot{z}$; and therefore $\frac{3}{2}x^{\frac{1}{2}}\dot{x}$, for the fluxion of $x^{\frac{3}{2}}$ (or $\overline{a^2+z^2}|^{\frac{3}{2}}$) is $=3z\dot{z}\sqrt{a^2+z^2}$.

3. To find the fluxion of the product of feveral variable quantities, multiply the fluxion of each, by the product of the reft of the quantities; and the fum of the products, thus arifing, will be the fluxion fought. Thus, the fluxion of xy is $\dot{x}y+\dot{y}x$; that of xyz, is $\dot{x}yz+\dot{y}xz+\dot{z}xy$; and that of $vxyz$ is $\dot{v}xyz+\dot{x}vyz+\dot{y}vxz+\dot{z}vxy$. Again, the fluxion of $\overline{a+x}\times\overline{b-y}=ab+bx-ay-xy$, is $b\dot{x}-a\dot{y}-x\dot{y}-\dot{y}x$.

4. To find the fluxion of a fraction, the rule is, from the fluxion of the numerator multiplied by the denominator, fubtract the fluxion of the denominator multiplied by the numerator, and divide the remainder by the fquare of the denominator. Thus the fluxion of $\frac{x}{y}$, is $\frac{y\dot{x}-x\dot{y}}{y^2}$; that of $\frac{x}{x+y}$, is $\frac{\dot{x}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times x}{\overline{x+y}|^2}=\frac{y\dot{x}-x\dot{y}}{\overline{x+y}|^2}$; and that of $\frac{x+y+z}{x+y}$, or

1 +

$1+\frac{z}{x+y}$, is $\frac{\dot{z}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times z}{\overline{x+y}|^{2}}$; and ſo of others.

In the examples hitherto given, each is reſolved by its own particular rule; but in thoſe that follow, the uſe of two or more of the above rules is requiſite: thus (by rule 2. and 3.) the fluxion of x^2y^2 is found to be $2x^2y\dot{y}+2y^2x\dot{x}$; that of $\frac{x^2}{y^2}$, is found (by rule 2. and 4.) to be $\frac{2y^2x\dot{x}-2x^2y\dot{y}}{y^4}$; and that of $\frac{x^2y^2}{z}$, is (by rule 2. 3. and 4.) found to be $\frac{2x^2y\dot{y}+2y^2x\dot{x}\times z-x^2y^2\dot{z}}{z^2}$.

5. When the propoſed quantity is affected by a coefficient, or conſtant multiplicator, the fluxion found as above muſt be multiplied by that coefficient or multiplicator: thus, the fluxion of $5x^3$, is $15x^2\dot{x}$; for the fluxion of x^3 is $3x^2\dot{x}$, which, multiplied by 5, gives $15x^2\dot{x}$. And, in the very ſame manner, the fluxion of ax^n will be $nax^{n-1}\dot{x}$.

Having thus explained the manner of determining the firſt fluxions of variable quantities, it remains to ſay ſomething of ſecond, third, &c. fluxions. We have already obſerved, that the ſecond fluxion of a quantity is the fluxion of the firſt fluxion; and by the third fluxion is meant the fluxion of the ſecond; the fourth, of the third; and ſo on. The fluxions, therefore, of every order are only the meaſures of the velocities by which their reſpective flowing quantities, *viz.* the fluxions of the immediately preceding order, are generated. Hence it appears, that a ſecond fluxion always ſhews the rate of the increaſe or decreaſe of the firſt fluxion; and that the third, fourth, &c. fluxions differ in nothing, except their order and notation, from firſt fluxions; and therefore are alſo determinable in the very ſame manner, by the rules already laid down: thus (by rule 4.) the (firſt) fluxion of x^3 is $3x^2\dot{x}$: and if $\dot{x}$ is ſuppoſed conſtant, that is, if the root x be generated with an equable or uniform velocity, the fluxion of $3x^2\dot{x}$ (or $3\dot{x}\times x^2$) again taken (by the ſame rule) will be $3\dot{x}\times 2x\dot{x}$, or $6x\dot{x}^2$; which therefore is the ſecond fluxion of x^3. Again, the third fluxion of x^3, or the fluxion of $6x\dot{x}^2$, is found to be $6\dot{x}^3$; further than which we cannot go in this caſe, becauſe the laſt fluxion $6\dot{x}^3$, is here a conſtant quantity.

In the preceding example, the root x is ſuppoſed to be generated with an equable velocity: but if the velocity be an increaſing or decreaſing one, then $\dot{x}$, expreſſing the meaſure thereof, being variable, will alſo have its fluxion, which is denoted, as ſaid above, by $\ddot{x}$; and the fluxion of $\ddot{x}$ by $\dddot{x}$, and ſo on, with reſpect to the higher orders.

Here follow ſome examples, wherein the root x (or y) is ſuppoſed to be generated with a variable velocity. Thus, the fluxion of x^3 being $3x^2\dot{x}$ (or $3x^2\times\dot{x}$) the fluxion of $3x^2\times\dot{x}$, conſidered as a rectangle, will (by rule 3.) be found to be $6x\dot{x}\times\dot{x}+3x^2\times\ddot{x}=6x\dot{x}^2+3x^2\ddot{x}$; which is the ſecond fluxion of x^3. Moreover, from the fluxion laſt found, we ſhall in like manner get $6\dot{x}\times\dot{x}^2+6x\times 2\dot{x}\ddot{x}+6x\dot{x}\times\ddot{x}+3x^2\times\dddot{x}$ (or $6\dot{x}^3+18x\dot{x}\ddot{x}+3x^2\dddot{x}$) for the third fluxion of x^3. Thus alſo, if $\dot{y}=nx^{n-1}\dot{x}$, then will $\ddot{y}=n\times\overline{n-1}\times x^{n-2}\dot{x}^2+n\ddot{x}x^{n-1}$; and if $\dot{z}^2=\dot{x}\dot{y}$, then will $2\dot{z}\ddot{z}=\dot{x}\ddot{y}+\dot{y}\ddot{x}$: and ſo of others.

The reader is here deſired, once for all, to take particular notice, that the fluxions of all kinds and orders whatever, are contemporaneous, or ſuch as may be generated together, with their reſpective velocities, in one and the ſame time.

Inverſe method of FLUXIONS, or the manner of determining the fluents of given fluxions.

If what is already delivered, concerning the direct method, be duly conſidered, there will be no great difficulty in conceiving the reaſons of the inverſe method: though the difficulties that occur in this laſt part, upon another account, are indeed vaſtly great. It is an eaſy matter, or not impoſſible at moſt, to find the fluxion of any flowing quantity whatever; but, in the inverſe method, the caſe is quite otherwiſe; for, as there is no method for deducing the fluent from the fluxion *a priori*, by a direct inveſtigation; ſo it is impoſſible to lay down rules for any other forms of fluxions, than thoſe particular ones that we know, from the direct method, belong to ſuch and ſuch kinds of flowing quantities: thus, for example, the fluent of $2x\dot{x}$ is known to be x^2; becauſe, by the direct method, the fluxion of x^2 is found to be $2x\dot{x}$: but the fluent of $y\dot{x}$ is unknown, ſince no expreſſion has been diſcovered that produces $y\dot{x}$ for its fluxion. Be this as it will, the following rules are thoſe uſed by the beſt mathe-

mathematicians, for finding the fluents of given fluxions.

1. To find the fluent of any simple fluxion, you need only write the letters without the dots over them: thus, the fluent of $\dot{x}$ is x, and that of $a\dot{x}+b\dot{y}$, is $ax+by$.

2. To assign the fluent of any power of a variable quantity, multiplied by the fluxion of the root; first divide by the fluxion of the root, add unity to the exponent of the power, and divide by the exponent so increased: for dividing the fluxion $nx^{n-1}\dot{x}$ by $\dot{x}$, it becomes nx^{n-1}; and adding 1 to the exponent $(n-1)$ we have nx^{n}; which, divided by n, gives x^{n}, the true fluent of $nx^{n-1}\dot{x}$. Hence, by the same rule, the fluent of $3x^{2}\dot{x}$ will be $=x^{3}$; that of $2x^{5}\dot{x}=\frac{x^{6}}{3}$; that of $y^{\frac{1}{2}}\dot{y}=\frac{2}{3}y^{\frac{3}{2}}$; that of $ay^{\frac{5}{3}}\dot{y}=\frac{3ay^{\frac{8}{3}}}{8}$; and that of $y^{\frac{m}{n}}\dot{y}=\frac{y^{\frac{m}{n}+1}}{\frac{m}{n}+1}=\frac{ny^{\frac{m+n}{n}}}{m+n}$; that of $\frac{a\dot{x}}{x^{n}}$, or $a\dot{x}x^{-n}=\frac{ax^{1-n}}{1-n}$; that of $\overline{a+z}|^{3}\times\dot{z}=\frac{\overline{a+z}|^{4}}{4}$; and that of $\overline{a^{m}+z^{m}}|^{n}\times z^{m-1}\dot{z}=\frac{\overline{a^{m}+z^{m}}|^{n+1}}{m\times\overline{n+1}}$.

In assigning the fluents of given fluxions, it ought to be considered, whether the flowing quantity, found as above, requires the addition or subtraction of some constant quantity, to render it complete: thus, for instance, the fluent of $nx^{n-1}\dot{x}$ may be either represented by x^{n} or by $x\pm a$; for a being a constant quantity, the fluxion of $x^{n}\pm a$, as well as of x^{n}, is $nx^{n-1}\dot{x}$.

Hence it appears, that the variable part of a fluent only can be assigned by the common method, the constant part being only assignable from the particular nature of the problem. Now to do this, the best way is to consider how much the variable part of the fluent, first found, differs from the truth, when the quantity which the whole fluent ought to express, is equal to nothing; then that difference, added to, or subtracted from, the said variable part, as occasion requires, will give the fluent truly corrected. To make this plainer by an example or two, let $\dot{y}=\overline{a+x}|^{3}\times\dot{x}$. Here we first find $y=\frac{\overline{a+x}|^{4}}{4}$; but when $y=0$, then $\frac{\overline{a+x}|^{4}}{4}$ becomes $=\frac{a^{4}}{4}$; since x, by hypothesis, is then $=0$: therefore $\frac{\overline{a+x}|^{4}}{4}$ always exceeds y by $\frac{a^{4}}{4}$; and so the fluent, properly corrected, will be $y=\frac{\overline{a+x}|^{4}-a^{4}}{4}=a^{3}x+\frac{3a^{2}x^{2}}{2}+ax^{3}+\frac{x^{4}}{4}$. Again, let $\dot{y}=\overline{a^{m}+x^{m}}|^{n}\times x^{m-1}\dot{x}$; here we first have $y=\frac{\overline{a^{m}+x^{m}}|^{n+1}}{m\times\overline{n+1}}$; and making $y=0$, the latter part of the equation becomes $\frac{\overline{a^{m}}|^{n+1}}{m\times\overline{n+1}}=\frac{a^{mn+m}}{m\times\overline{n+1}}$; whence the equation or fluent, properly corrected, is $y=\frac{\overline{a^{m}+x^{m}}|^{n+1}-a^{mn+m}}{m\times\overline{n+1}}$.

Hitherto x and y are both supposed equal to nothing, at the same time; which will not always be the case: thus, for instance, though the sine and tangent of an arch are both equal to nothing, when the arch itself is so; yet the secant is then equal to the radius. It will therefore be proper to add some examples, wherein the value of y is equal to nothing, when that of x is equal to any given quantity a. Thus, let the equation $\dot{y}={}^{2}\dot{x}$, be proposed; whereof the fluent first found is $y=\frac{x^{3}}{3}$; but when $y=0$, then $\frac{x^{3}}{3}=\frac{a^{3}}{3}$, by the hypothesis; therefore the fluent, corrected, is $y=\frac{x^{3}-a^{3}}{3}$. Again, suppose $\dot{y}=x^{n}\dot{x}$; then will $y=\frac{x^{n+1}}{n+1}$; which, corrected,

becomes

becomes $y = \frac{a^{n+1} - x^{n+1}}{n+1}$. And lastly, if $\dot{y} = \overline{c^3 + bx^2}|^{\frac{1}{2}} \times x\dot{x}$; then, first, $y = \frac{\overline{c^3 + bx^2}|^{\frac{3}{2}}}{3b}$: therefore the fluent corrected is $y = \frac{\overline{c^3 + bx^2}|^{\frac{3}{2}} - \overline{c^3 + ba^2}|^{\frac{3}{2}}}{3b}$.

3. To find the fluents of such fluxionary expressions as involve two or more variable quantities, substitute, instead of such fluxion, its respective flowing quantity; and, adding all the terms together, divide the sum by the number of terms, and the quotient will be the fluent. Thus, the fluent of $\dot{x}y + \dot{y}x = \frac{xy + xy}{2} = \frac{2xy}{2} = xy$; and the fluent of $\dot{x}yz + \dot{y}xz + \dot{z}yx = \frac{xyz + xyz + xyz}{3} = \frac{3xyz}{3} = xyz$.

But it seldom happens that these kinds of fluxions, which involve two variable quantities in one term, and yet admit of known and perfect fluents, are to be met with in practice.

Having thus shewn the manner of finding such fluents as can be truly exhibited in algebraic terms, it remains now to say something with regard to those other forms of expressions involving one variable quantity only; which yet are so affected by compound divisors and radical quantities, that their fluents cannot be accurately determined by any method whatsoever. The only method with regard to these, of which there are innumerable kinds, is to find their fluents by approximation, which, by the method of infinite series, may be done to any degree of exactness. See the article SERIES.

Thus, if it were proposed to find the fluent of $\frac{a\dot{x}}{a-x}$, it becomes necessary to throw the fluxion into an infinite series, by dividing $a\dot{x}$ by $a - x$: thus, $a\dot{x} \div \overline{a-x} = \dot{x} + \frac{x\dot{x}}{a} + \frac{x^2\dot{x}}{a^2} + \frac{x^3\dot{x}}{a^3} + \frac{x^4\dot{x}}{a^4} +$, &c. Now the fluent of each term of this series, may be found by the foregoing rules to be $x + \frac{x^2}{2a} + \frac{x^3}{3a^2} + \frac{x^4}{4a^3} + \frac{x^5}{5a^4} +$, &c.

Again, to approximate the fluent of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}} \times x^n\dot{x}}{\overline{c^2-x^2}|^{\frac{1}{2}}}$, we first find the value of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}}}{\overline{c^2-x^2}|^{\frac{1}{2}}}$ expressed in a series to be $\frac{a}{c} + \overline{\frac{a}{2c^3} - \frac{1}{2ac}} \times x^2 + \overline{\frac{3a}{8c^5} - \frac{1}{4ac^3} - \frac{1}{8a^3c}} \times x^4 + \overline{\frac{5a}{16c^7} - \frac{3}{16ac^5} - \frac{1}{16a^3c^3} - \frac{1}{16a^5c}} \times x^6 +$, &c. which value being multiplied by $x^n\dot{x}$, and the fluent taken by the rules above laid down, we get $\frac{ax^{n+1}}{\overline{n+1} \times c} + \overline{\frac{a}{2c^3} - \frac{1}{2ac}} \times \frac{x^{n+3}}{n+3} + \overline{\frac{3a}{8c^5} - \frac{1}{4ac^3} - \frac{1}{8a^3c}} \times \frac{x^{n+5}}{n+5} + \overline{\frac{5a}{16c^7} - \frac{3}{16ac^5} - \frac{1}{16a^3c^3} - \frac{1}{16a^5c}} \times \frac{x^{n+7}}{n+7} +$, &c.

In order to shew the usefulness of fluxions, we shall give an example or two. Thus, suppose it were required to divide the given right line A B into two such parts,

A C B

A C, C B, that their products or rectangles, may be the greatest possible. Let $AB = a$, and let the part A C, considered as variable (by the motion of C towards B) be denoted by x. Then B C being $= a - x$, we have $AC \times BC = ax - xx$, whose fluxion $a\dot{x} - 2x\dot{x}$ being put $= 0$, we get $a\dot{x} = 2x\dot{x}$; and, consequently, $x = \frac{1}{2}a$. Hence it appears that A C (or x) must be exactly one half of A B.

Again, suppose it were required to find the solid contents of a spheroid, AFBH (plate XCVIII. fig. 6. n° 3.) Let the axis A B, about which the solid is generated, be $= a$, the radius $= p = 1$, and the other axis F H of the generating ellipsis $= b$; then, from the property of the ellipsis, we have $a^2 : b^2 :: AD \times BD$ $(x \times \overline{a-x}) : DE^2 \ (y^2)$. Hence $y^2 = \frac{b^2}{a^2} \times \overline{ax - xx}$; and the fluxion of the solid $\dot{s} \ (= py^2\dot{x}) = \frac{pb^2}{a^2} \times \overline{ax\dot{x} - x^2\dot{x}}$; and the solidity $s = \frac{pb^2}{a^2} \times \overline{\frac{1}{2}axx - \frac{1}{3}x^3}$ = the segment AIE; which, when AD (x) = AB (a), becomes $\left(\frac{pb^2}{a^2} \times \overline{\frac{1}{2}a^3 - \frac{1}{3}a^3}\right)$

$\frac{1}{6}pab^2 =$ the content of the whole ſpheroid. Where, if b (F H) be taken $= a$ (A B), we ſhall alſo get $\frac{1}{6}pa^3$ for the true content of the ſphere, whoſe diameter is a. Hence a ſphere or ſpheroid is $\frac{2}{3}$ of its circumſcribing cylinder: for the area of the circle F H being expreſſed by $\frac{pb^2}{4}$, the content of the cylinder whoſe diameter is F H, and altitude A B, will be $\frac{pb^2a}{4}$; of which $\frac{1}{6}pab^2$ is evidently two third parts.

For the other uſes of fluxions, ſee the articles MAXIMUM, QUADRATURE, TANGENT, SOLID, &c.

FLUXION, or rather DEFLUXION, in medicine. See the article DEFLUXION.

FLY, in zoology, a large order of inſects, the diſtinguiſhing characteriſtic of which is, that their wings are tranſparent; by this they are diſtinguiſhed from beetles, butterflies, and graſshoppers. See the articles BEETLE, BUTTERFLY, &c.

Flies are ſubdivided into thoſe which have four, and thoſe which have two wings.

Of thoſe with four wings, there are ſeveral genera or kinds, as the ant, apis, tenthredo, ichneumon, &c. See the articles ANT, APIS, &c.

Of thoſe with two wings there are likewiſe ſeveral kinds, as the gad-fly, waſp-fly, gnat, tipula, &c. See GAD-FLY, &c.

Thoſe who deſire a more particular account of the anatomy, generation, ſtructure, and manifold ſubdiviſions of flies, may conſult Reaumur's Hiſtory of Inſects, tom. 4.

FLY, in mechanics, a croſs with leaden weights at its ends, or rather a heavy wheel at right angles to the axis of a windlas, jack, or the like; by means of which the force of the power, whatever it be, is not only preſerved, but equally diſtributed in all parts of the revolution of the machine.

The fly may be applied to ſeveral ſorts of engines, whether moved by men, horſes, wind, or water, or any other animate or inanimate power; and is of great uſe in thoſe parts of an engine which have a quick circular motion, and where the power of the reſiſtance act unequally in the different parts of a revolution. This has made ſome people imagine, that the fly adds a new power; but tho' it may be truly ſaid to facilitate the motion, by making it more uniform, yet upon the whole it cauſes a loſs of power, and not an increaſe: for as the fly has no motion of its own, it certainly requires a conſtant force to keep it in motion; not to mention the friction of the pivots of the axis, and the reſiſtance of the air. The reaſon, therefore, why the fly becomes uſeful in many engines, is not that it adds a new force to them; but becauſe, in caſes where the power acts unequally, it ſerves as a moderator to make the motion of revolution almoſt every where equal: for as the fly has accumulated in itſelf a great degree of power, which it equally and gradually exerts, and as equally and gradually receives, it makes the motion in all parts of the revolution pretty nearly equal and uniform. The conſequence of this is, that the engine becomes more eaſy and convenient to be acted and moved by the impelling force; and this is the only benefit obtained by the fly.

The beſt form for a fly, is that of a heavy wheel or circle, of a fit ſize, as this will not only meet with leſs reſiſtance from the air, but being continuous, and the weight every where equally diſtributed through the perimeter of the wheel, the motion will be more eaſy, uniform, and regular. In this form, the fly is moſt aptly applied to the perpendicular drill, which it likewiſe ſerves to keep upright by it centrifugal force: alſo to a windlas or common winch, where the motion is quick; for in pulling upwards from the lower part, a perſon can exerciſe more power than in thruſting forward in the upper quarter: where, of courſe, part of his force would be loſt, were it not accumulated and conſerved in the equable motion of the fly. Hence, by this means, a man may work all day in drawing up a weight of 40 lb. whereas 30 lb. would create him more labour in a day without the fly.

In order to calculate the force of the fly joined to the ſcrew for ſtamping the image upon coins, let us ſuppoſe the two arms of the fly to be each fifteen inches long, meaſuring from the center of the weight to the axis of motion, the weights to be fifty pounds each, and the diameter of the axis preſſing upon the dye, to be one inch. If every ſtroke be made in half a ſecond, and the weights deſcribe an half circumference, which in this caſe will be four feet, the velocity will at the inſtant of the ſtroke be at the rate of eight feet in a ſecond, ſo that the momentum of it will be 800; but the arms of the fly being as levers, each fifteen inches long, whilſt the ſemi-axis is only half an inch, we

muſt

must increase this force thirty times, which will give 24000; an immense force, equal to 100 ℔. falling 120 feet, or near two seconds in time; or to a body of 750 ℔. falling $16\frac{1}{12}$ feet, or one second in time. Some of the engines for coining crown-pieces have the arms of the fly five times as long, and the weights twice as heavy; so that the effect is ten times greater. See the article COINING.

FLY, in the sea-language, that part of the mariner's compass, on which the several winds or points are drawn. See the article COMPASS.

Let fly the sheet, is a word of command to let loose the sheet, in case of a gust of wind, lest the ship should overset, or spend her top-sails and masts; which is prevented by letting the sheet go a-main, that it may hold no wind.

FLY, among sportsmen. When a hawk missing her quarry, betakes herself to the next check, as crows, *&c.* they say she *flies on head*. When a hawk flies at great birds, as cranes, geese, *&c.* they say she *flies gross*. A horse is said to fly the heels, when he obeys the spurs.

FLY-BOAT, a large vessel with a double prow, carrying from seven to eight hundred weight of goods.

FLYERS, in architecture, such stairs as go straight, and do not wind round; nor have the steps made tapering, but the fore and back part of each stair, and the ends, respectively parallel to one another; so that if one flight do not carry you to your intended height, there is a broad half space, from whence you begin to fly again, with steps every where of the same length and breadth, as before.

FLYING, the progressive motion of a bird, or other winged animal, in the liquid air. The parts of birds chiefly concerned in flying, are the wings, by which they are sustained or wafted along. The tail, Messeurs Willoughby, Ray, and many others, imagine to be principally employed in steering and turning the body in the air, as a rudder: but Borelli has put it beyond all doubt, that this is the least use of it, which is chiefly to assist the bird in its ascent and descent in the air; and to obviate the vacillations of the body and wings: for, as to turning to this or that side, it is performed by the wings, and inclinations of the body, and but very little by the help of the tail. The flying of a bird, in effect, is quite a different thing from the rowing of a vessel. Birds do not vibrate their wings towards the tail, as oars are struck towards the stern, but waft them downwards: nor does the tail of the bird cut the air at right angles, as the rudder does the water; but is disposed horizontally, and preserves the same situation what way soever the bird turns.

In effect, as a vessel is turned about on its center of gravity to the right, by a brisk application of the oars to the left, so a bird in beating the air with its right wing alone, towards the tail, will turn its fore part to the left. Thus pigeons, changing their course to the left, would labour it with their right wing, keeping the other almost at rest. Birds of a long neck alter their course by the inclinations of their head and neck, which altering the course of gravity, the bird will proceed in a new direction.

The manner of FLYING is thus: the bird first bends his legs, and springs with a violent leap from the ground; then opens and expands the joints of his wings, so as to make a right line perpendicular to the sides of his body: thus the wings, with all the feathers therein, constitute one continued lamina. Being now raised a little above the horizon, and vibrating the wings with great force and velocity perpendicularly against the subject air, that fluid resists those succussions, both from its natural inactivity and elasticity, by means of which the whole body of the bird is protruded. The resistance the air makes to the withdrawing of the wings, and consequently the progress of the bird, will be so much the greater, as the waft or stroke of the fan of the wing is longer: but as the force of the wing is continually diminished by this resistance, when the two forces come to be in equilibrio, the bird will remain suspended in the same place; for the bird only ascends so long as the arch of air the wing describes, makes a resistance equal to the excess of the specific gravity of the bird above the air. If the air, therefore, be so rare as to give way with the same velocity as it is struck withal, there will be no resistance, and consequently the bird can never mount. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct ascent, the natural and artificial tendency would oppose and destroy each other, so that the progress would be very slow. In a direct descent they would aid one another, so that the fall would be too precipitate.

Artificial FLYING, that attempted by men, by the aſſiſtance of mechanics.

The a t of flying has been attempted by ſeveral perſons in all ages. The Leucadians, out of ſuperſtition, are reported to have had a cuſtom of precipitating a man from a high cliff into the ſea, firſt fixing feathers,variouſly expanded, round his body, in order to break his fall. Frier Bacon, who lived near five hundred years ago, not only affirms the art of flying poſſible, but aſſures us, that he himſelf knew how to make an engine wherein a man ſitting might be able to convey himſelf through the air, like a bird; and further adds, that there was then one who had tried it with ſucceſs: but this method, which conſiſted of a couple of large, thin, hollow copper globes, exhauſted of the air, and ſuſtaining a perſon who ſat thereon, Dr. Hook ſhews to be impracticable. The philoſophers of K. Charles the ſecond's reign, were mightily buſied about this art. The famous biſhop Wilkins was ſo confident of ſucceſs in it, that he ſays, he does not queſtion but, in future ages, it will be as uſual to hear a man call for his wings, when he is going a journey, as it is now to call for his boots.

FLYING-ARMY, a ſmall body under a lieutenant or major general, ſent to harraſs the country, intercept convoys, prevent the enemy's incurſions, cover its own garriſons, and keep the enemy in continual alarm.

FLYING-BRIDGE. See the article BRIDGE.

FLYING-CAMP. See the article CAMP.

FLYING-FISH, a name given by the engliſh writers to ſeveral ſpecies of fiſh, which, by means of their long fins, have a method of keeping themſelves out of water a long time. See the article EXOCOETUS, MILVUS, &c.

FLYING PINION, is part of a clock, having a fly, or fan, whereby to gather air, and ſo bridle the rapidity of the clock's motion, when the weight deſcends in the ſtriking part. See the article CLOCK.

FOAL, or COLT, the young of the horſe kind. The word colt among the dealers, is underſtood of the male kind.

Foals are uſually foaled about the beginning of ſummer, and it is the cuſtom to let them run till Michaelmas with the mare, at which time they are to be weaned. Some, however, are of opinion, that a foal is rendered much ſooner fit for ſervice by being allowed to ſuck the whole winter, and weaned about Candlemas or Shrovetide. When firſt weaned, the muſt be kept in a convenient houſe, with a low rack and manger for hay and oats; the hay muſt be very ſweet and fine, eſpecially at firſt, and a little white bran ſhould be mixed with their oats, in order to keep their bodies open, and make them eat and drink freely.

When foals are kept up in the winter, they are not to be immured continually in the ſtable; but in the middle of the day, when the ſun ſhines warm, they ſhould always be allowed to play about for an hour or two, and when the winter is ſpent, they ſhould be turned into ſome dry ground where the graſs is ſweet and ſhort, and where there is good water, that they may drink at pleaſure. The winter after this, they may be kept in the ſtable without any further care than that which is taken of other horſes; but after the firſt year, the mare foals and horſe foals are not to be kept together.

There is no difficulty to know the ſhape a foal is like to be of; for the ſame ſhape he carries at a month, he will carry at ſix years old, if he be not abuſed in after keeping. As for his heighth, it is obſerved that a large ſhin bone, long from the knee to the paſtern, ſhews a tall horſe; for which another way is to ſee what ſpace he has between his knee and his withers, which being doubled, it will be his height when he is a full aged horſe. There are alſo means of knowing their goodneſs; for if they are of ſtirring ſpirits, free from frights, wanton of diſpoſition, and very active in leaping and running, and ſtriving for maſtery, they prove generally good mettled horſes. It is a good mark alſo if their hoofs be ſtrong, deep, tough, ſmooth, upright ſtanding, and hollow. For the manner of breaking them, ſee the article HORSE.

FOCAGE, the ſame with fire-bote. See the article FIRE-BOTE.

FOCHEN, a town of China, capital of the province of Fokien: eaſt long. 118°, north lat. 26° 20′.

FOCUS, in geometry and conic ſections, is applied to certain points in the parabola, ellipſis, and hyperbola, where the rays reflected from all parts of theſe curves concur and meet.

FOCI *of an ellipſis*, are two points in the longeſt axis, on which as centers the figure is deſcribed. See ELLIPSIS.

If from the foci two right lines are drawn, meeting one another in the periphery of the ellipſis, their ſum will be always

always equal to the longeſt axis; and therefore when an ellipſis and its two axes are given, and the foci are required, you need only take half the longeſt axis in your compaſſes, and ſetting one foot in the end of the ſhorter, the other foot will cut the longer in the focus required.

FOCUS *of an hyperbola*, is that point in the axis, through which the latus rectum paſſes; from whence if any two right lines are drawn meeting in either of the oppoſite hyperbolas, their difference will be equal to the principal axis. See the article HYPERBOLA.

FOCUS *of a parabola*, a point in the axis within the figure, diſtant from the vertex one fourth part of the latus rectum. See the article PARABOLA.

FOCUS, in optics, is the point wherein rays are collected, after they have undergone reflection or refraction. See the articles MIRROUR and LENS.

Principal FOCI *of a lens*, are the two foci F, *f*, (plate CI. fig. 1. n° 1.) of rays coming parallel to the axis of the lens, and E F or or E *f* is called its focal diſtance, and by authors its focal length.

It appears from the laws of optics, as well as from experiments, that the focal diſtance of a plano-convex, or of a plano-concave glaſs, is equal to a diameter of its convex or concave ſurfaces; that is, of the whole ſphere it belongs to; ſecondly, that the focal diſtance of a double convex or a double concave glaſs of equal convexities or concavities, is equal to a ſemi-diameter of either of its ſurfaces: and conſequently that the focal diſtance of a glaſs of unequal convexities or unequal concavities, will have an intermediate length between a diameter and a ſemi-diameter of that ſurface which is moſt convex or moſt concave.

Virtual FOCUS, a term uſed by Mr. Molyneux for that point from which refracted rays begin to diverge. It is alſo called the point of diſperſion or divergency.

It is remarkable, 1. That in concave glaſſes, when a ray falls from air parallel to the axis, the virtual focus by its firſt refraction, is at the diſtance of a diameter and a half of the concavity. 2. In plano-concave glaſſes, when the rays fall parallel to the axis, the virtual focus is diſtant from the glaſs the diameter of the concavity. 3. In plano-concave glaſſes, as 107 to 193, ſo is the radius of the concavity to the diſtance of the virtual focus. 4. In double concaves of the ſame ſphere, parallel rays have their virtual focus at the diſtance of the radius of the concavity. 5. But whether the concavities be equal or unequal, the virtual focus or point of divergency of the parallel rays is determined by this rule. As the ſum of the radii of both concavities is to the radius of either concavity, : : ſo is the double radius of the other concavity : to the diſtance of the virtual focus. 6. In concave glaſſes, if the point to which the incident ray converges be diſtant from the glaſs farther than the virtual focus of parallel rays, the rule for finding the virtual focus of this ray is this. As the difference of the diſtance between this point from the glaſs, and the diſtance of the virtual focus from the glaſs : is to the diſtance of the virtual focus : : ſo is the diſtance of this point of convergence from the glaſs : to the diſtance of the virtual focus of this converging ray. 7. In concave glaſſes, if the point to which the incident ray converges be nigher to the glaſs than the virtual focus of parallel rays, the rule to find where it croſſes the axis is this. As the exceſs of the virtual focus more than this point of convergency : is to the virtual focus : : ſo is the diſtance of this point of convergency from the glaſs : to the diſtance of the point where this ray croſſes the axis.

The FOCUS *of incident rays upon a lens being given, to find the* FOCUS *of the emergent rays.* Let Q (*ibid.* n° 2.) be the focus of incident rays given, and *q* the focus of emergent rays required; draw Q E the axis of the pencil, and with the center E and ſemidiameter E F, equal to the focal diſtance of the lens, deſcribe an arch F G, cutting any incident ray Q A in G; join E G, and drawing A *q* parallel to it, the point *q*, where it cuts the axis of the pencil, will be the focus of the emergent rays. For ſuppoſing other rays, beſides G A, to flow from or towards G, they will emerge parallel to their axis G E produced.

The FOCUS *of rays falling almoſt perpendicularly upon a given ſpherical ſurface being given, to find their focus after refractions.* Let O I (*ibid.* n° 3.) be the given ſurface, whoſe center is S; and in any radius O S produced, let Q be the given focus of the incident rays as Q I, it is required to find the focus *q* of the refracted rays. Call O S, O Q, O *q* reſpectively S, Q, *q*; and let the given ratio of the ſines of refraction be *m* to *n*, and let *m* be bigger than *n*. Then joining S I,

S I, ſince very ſmall angles are very nearly proportionable to their ſines, we have the angle O S I : to the angle S I Q : : Q : Q—S, and the angle S I Q : to the angle S I q : : m : n. And by compounding theſe proportions we have the angle O S I : to the angle S I q : : m Q : n Q — n S, and disjointly we have the angle O S I : to the angle S q I, that is q : S :: m Q : $\overline{m-n}$ Q + n S. Whence, putting $\theta = m - n$, we have this theorem, $q = \frac{m\,Q\,S}{\theta Q + nS} = \frac{\frac{m}{\theta} S\,Q}{Q + \frac{n}{\theta} S}$. This is the value of q in the given caſe, where the lines O Q, O S, O q lie all on the ſame ſide of the ſurface O I; and thence the theorem for q may be eaſily adapted to any other given caſe, by conſidering O Q as being always affirmative, and by changing the ſign of S when O S and O Q lie on contrary ſides of their origin O; and by changing the ſign of θ, when the ſign of incidence is leſs than the ſine of refraction; and, laſtly, by placing O q the contrary way to O Q, when the value of q comes out negative by the theorem ſo changed.

Theorem for reflected rays. Subſtitute $-m$ in the preceding theorem for n, and conſequently $2m$ for θ, and we have $q = \frac{\frac{1}{2} S\,Q}{Q - \frac{1}{2} S}$; which theorem gives the focus of rays reflected from the ſpherical ſurface O I. For the calculation continues the ſame, whether the rays go forwards or backwards in the line I q; and to change the angle of refraction S I q (*ibid.* n° 3.) into an angle of reflection, it and its ſine n muſt be diminiſhed to nothing, and then become negative and equal to $-m$, the ſine of the angle of incidence S I Q (*ibid.* n° 4.)

Having the FOCUS *of rays falling almoſt perpendicularly upon a given lens, to find their focus after refractions.* Let O I E o (*ibid.* n° 5.) be the given lens, whoſe vertex's are O and o; R the center of the firſt ſurface O I; r the center of the ſecond o E; P the given focus of incident rays in the axis o O r R; and p the focus of the emergent rays required. Let ϖ be their focus after the firſt refraction at the ſurface O I, and m to n the ratio of the ſines as above, and call O o, $o\,r$, O R, O P, $o\,p$, reſpectively o, r, R, P, p. Then for Q, S, m, n, θ in the foregoing theorem, write P, R, m, n, θ; and we have O $\varpi = \frac{m\,P\,R}{\theta P + nR}$; to which adding O o, or o, we have $o\,\varpi$ or $\varpi = \frac{mPR + \theta Po + nRo}{\theta P + nR}$

Again, for Q, S, m, n, θ in the foregoing theorem, write ϖ, r, n, m, $-\theta$; and we have $p = \frac{n\,r\,\varpi}{-\theta\varpi + mr}$; in which by ſubſtituting the value of ϖ, we have $p = \frac{mnPRr + n\theta Pro + nnRro}{m\theta Pr - m\theta PR + mnRr - \theta\theta Po - n\theta Ro}$

This theorem for a miniſcus lens, having its concave ſurface expoſed to P, is eaſily adapted to a lens of any given form, by conceiving one or both its ſemi-diameters O R, $o\,r$, to decreaſe or increaſe, or to become infinite and then negative, till the miniſcus acquires the form of the given lens; and by changing the ſign of R or r, when the ſemi-diameters lie on oppoſite ſides of their ſurfaces O, o, to the focus P; and, laſtly, by placing p on the oppoſite ſide of o to P, when its value in the theorem ſo changed comes out negative. Thus by writing ∞ (which denotes infinite) for R, this theorem is eaſily adapted to a plano-convex lens, having its firſt ſurface plane; and by writing —R for R, it is adapted to a double convex lens; and by writing —R for R, and ∞ for r, it is adapted to a plano-convex lens whoſe firſt ſurface is convex; and by writing —R for R, and —r for r, and $o + r$ for R, it is adapted to a lens of concentric ſurfaces, whoſe firſt ſurface is convex; and by writing R + o for r, it is adapted to a lens of concentric ſurfaces whoſe firſt ſurface is concave; and by writing ∞ for r, it is adapted to a plano-concave lens, whoſe firſt ſurface is concave; and by writing — r for r, it is adapted to a double concave; and by writing ∞ for R, and — r for r, it is adapted to a plano-concave whoſe firſt ſurface is plane; and, laſtly, it is adapted to a ſphere whoſe ſemi-diameter is R and diameter O o, by writing —R for R, and R for r, and 2 R for o; and by ſubſtituting given numbers for the ratio of refraction, the bigger for m, and the leſſer for n, it is adapted to lens's of any given ſubſtances.

Before the diſcovery of the law of refraction, according to the given ratio of the ſines of incidence and refraction of any given magnitudes, opticians could only conſider the refractions of ſuch rays as fell

fell almost perpendicularly upon the refracting surfaces, where the angles of incidence and refraction being but small, were known by experience to be nearly in a given ratio to each other, and these rays they found would all belong to one focus pretty nearly. But Dr. Barrow observing that the several small portions of a large pencil of rays flowing from a given focus, would diverge after refraction or reflection from several different foci, according as they fell with different obliquities upon the several parts of a spherical surface, and being of opinion that the eye receiving a certain small portion of these rays, would judge the object to appear in the place from which they diverged, and consequently to appear in different places according as the eye received a different portion, took occasion from thence to determine these places geometrically by means of the law of refraction, then newly discovered; and consequently to handle the subject of dioptrics and catoptrics, in a more extensive manner than any writer had then done. The foci of rays obliquely refracted and reflected, have also been touched upon by Sir Isaac Newton in his optical lectures, in order to determine the diameters and breadths of the rainbows, and to make way for his admirable theorems concerning the separations of heterogeneal rays. The reader, therefore, desirous of being fully instructed in the determinations of the foci of rays falling with any degrees of obliquity upon any number of reflecting and refracting surfaces of any sort, may consult the above-mentioned writers, as also Dr. Smith's optics, book 2. chap 9. and the remarks on that chapter, where the chief discoveries of Sir Isaac and Dr. Barrow are not only comprehended, but made much more general, by shewing that the relation of the focus's of incident and emergent rays, to the focus's of parallel rays coming contrary ways is always the same, after any number of oblique refractions or reflections, as when a pencil of rays is but once refracted or reflected at the vertex of a single surface.

FODDER, any kind of meat for horses, or other cattle. In some places, hay and straw, mingled together, is peculiarly denominated fodder.

FODDER, in the civil law, is used for a prerogative that the prince has, to be provided of corn and other meats for his horses, by the subjects, in his warlike expeditions.

FODDER, in mining, a measure containing twenty-two hundred and an half weight, though in London but twenty hundred weight.

FODINA, in anatomy, the labyrinth of the ear. See the article EAR.

FOECES and FOECULA. See the articles FÆCES and FÆCULA.

FOECIALES, or FECIALES, in roman antiquity. See the article FECIALES.

FOECUNDITY, or FECUNDITY, the same with fertility. See FERTILITY.

FOENICULUM, *fennel*, in botany, a species of anethum or dill. See the articles DILL and FENNEL.

FOENUGREEK, *fœnum græcum*, in botany, is called by Linnæus trigonella. See the article TRIGONELLA.

The figure of fœnugreek-seed is singular, being irregularly rhomboidal, considerably thick, with a line or depression running obliquely from one of the opposite angles to the other. It is of a pale-yellowish colour, and of an extremely tough and firm texture. It is of a strong and agreeable smell, and of a faint nauseous taste. We have it from Germany. Fœnugreek is used externally on many occasions by way of cataplasm or fomentation; being emollient and discutient in a great degree, and found to give great relief in pains, bruises, &c. It is sometimes also an ingredient in emollient clysters, where anodynes and carminatives are required, without too much pungency. It is also an ingredient in the ointment of marsh-mallows, and some other shop-compositions; but is never given internally.

FOETOR, in medicine, stinking or fœtid effluvia, arising from the body, or any part thereof.

FOETOR NARIUM, a fœtid stench of the nostrils, arising from a deep ulcer within the nose, the cause of which, according to Galen, is a sharp humour falling from the brain upon the mamillary processes. See the article ULCER.

This is one of the causes for which marriage might, in former times, be annulled.

FOETOR ORIS, a term used by medical writers to express that bad smell in the mouth, usually, though often improperly, called a stinking breath.

This is a malady arising in different cases from very different causes, as from the scurvy, and particularly from that species of it which affects the mouth, and is therefore called stomocace; from the french

french pox; from an ulceration, whether simple or fistulous, in the lungs, which is the case in consumptions; from ulcers in the mouth; from a caries or rottenness of the teeth, or from any other impurity of them; from crudities in the stomach, arising from a bad digestion; and particularly from a weakness about the left orifice of the stomach, from which part the fœtid vapour will often arise in very great abundance.

According to the different causes of this disorder, it requires a very different method of cure; in cases where it depends on the scurvy, pox, or other diseases, then those diseases are to be attacked by the proper medicines. See SCURVY, POX, &c.

When it arises from a carious tooth, there is no other cure for it but drawing the tooth. When the impurities of the teeth occasion it, the cleaning them proves a cure.

FOETUS, in physiology, denotes the child while it is contained in the mother's womb, but particularly after it is formed, till which time it is more properly called embryo. See the article GENERATION.

Formation of a FOETUS. The formation of the bones in a fœtus, is very gradual and regularly performed. In the first two months, there is nothing of a bony nature in the whole. After this, the hardness of the parts, where the principal bones are to be situated, becomes, by degrees, perceptible. Dr. Keikring describes the progress of the ossification from skeletons, which he had prepared from fœtuses of two months, and thence up to nine. In the first two months, or to the end of that time, there appears not any thing bony. After this, in the third and fourth months, the several parts, one after another, acquire their bony nature. In the first stages, every thing is membranous, where the bones are to be: these, by degrees, transmigrate into cartilages, and from these, by the same sort of change continued, the bones themselves are by degrees formed. All this is done by nature, by such slow, though such certain progressions, that the nicest eye can never see it doing, though it easily sees it when done.

Fœtuses increase proportionably less, the longer they continue in the womb. Mauriceau pretends, that the increase of a fœtus is sixty-four times its own weight in triple the time. Thus, he says, that, at the birth, a child weighs twelve pounds, of sixteen ounces each; at the three months, it weighs three ounces; at one month, $\frac{3}{8}$ of a drachm; and at ten days, less than half a grain.

Anatomy of a FOETUS. In the examination of the fœtus intire, we first observe the membranes surrounding it in the uterus, as in an egg; the exterior of these is the chorion; the interior, or second membrane, is the amnios; and a third, tho' its existence is disputed in human subjects, is the allantois. See the articles CHORION, AMNIOS, and ALLANTOIS.

After the membranes including the fœtus, we are next to examine the placenta, the number of which, in human subjects, answers to that of the fœtuses. See the article PLACENTA.

After the placenta, we are to observe the umbilical vessels of the fœtus, which, after the birth, degenerate into ligaments. See UMBILICAL and ARTERY.

Another part belonging to the umbilical vessels observable in the human fœtus, is the funiculus umbilicalis, or navel-string. See the article NAVEL.

The more essential differences between the human fœtus and an adult, considering the fœtus not only as yet enclosed within the womb, but as newly come from it, are as follows.

In the abdomen, the umbilical vein and arteries of the navel, and the canalis venosus in the liver, are in the fœtus open and pervious; in adults, they are contracted and solid. The liver is very large, the stomach is filled with a glutinous fluid, and the larger intestines, and often the ilium also, with the fæces called meconium. The renes succenturiati, are larger in the fœtus than in adults. The kidneys themselves are not smooth and even on the surface, as in adults, but unequal, and in some measure resemble those of a calf. The urinary bladder is of a longer shape, and extends almost to the navel. The hymen in a female fœtus, is very plain and obvious. In the thorax, besides a peculiar fluid, found as well in this cavity as in the abdomen, the gland thymus is larger than it is in adults. The lungs, as they have never yet been inflated by breathing, are collapsed, and of a blackish colour; and if thrown into water they sink in it, contrary to what is the case in those in adults. In the heart, the foramen ovale between the left and right auricle, and the canalis arteriosus, between the pulmonary artery and the aorta, are open, to serve for

a peculiar circulation in the fœtus, which has not yet breathed; and there is in the inferior trunk of the vena cava, near the heart, a remarkable valve, called by Chefelden in his anatomy, valvula nobilis. See the article VALVE.

In the head, befides its great fize in proportion to the body, we are to obferve, that the offa cranii are in feveral places diftant from one another, efpecially at the fontanella; and that the futures are wanting. The brain alfo is fofter than in adults. The teeth are alfo imperfect, and not rooted in the gums; they lie hid or buried under the gums, to appear at a more advanced period. The meatus auditorius is not yet perfect in them; and in the fœtus, whilft it is in the womb, is entirely clofed up by a peculiar membrane, which is continuous with the epidermis, and which naturally difappears after delivery. The bones of the whole body, excepting only a very few, are either foft or yet abfolutely imperfect: fome of them are merely cartilaginous, and the articulations are not at that time perfected.

Situation of the FOETUS *in the womb.* This, in the firft months, and even in the middle ones, is perfectly uncertain; but in the latter months, it is more regular; in thefe it is ufually in a pofture like that of fitting, and its head and neck are bent downwards; its knees are raifed up towards its cheeks; and its heels drawn up to its buttocks. Its hands are ufually hanging down, and embrace the feet. A little time before the delivery, it ufually changes its pofition, in fuch a manner, that its head falls towards the mouth of the womb, and its buttocks and feet are turned upwards. Frequently, however, it varies during the whole time of the pregnancy from the common rule, and at the very inftant of the delivery, its head does not prefent itfelf, but is turned to one fide, or to fome other part of the womb.

For the exclufion of the fœtus from the uterus, fee the article DELIVERY.

Nutrition of the FOETUS. How the nutrition of the fœtus is performed, is difputed among the learned. Heifter is of opinion, that the nutrition of the fœtus, during the firft months, while the organs of concoction are not yet formed, is probably effected by means of the navel-ftring alone. But in the more advanced ftate of the fœtus, in the latter months, that great anatomift fuppofes, that it is alfo nourifhed by the mouth, by means of a foft and fomewhat glutinous fluid that furrounds it, and which is probably fecreted from the amnios. In fupport of this opinion he obferves, 1. That a fluid fimilar to that of the amnios, is found in the mouth, the œfophagus, and the ftomach, not only of the human fœtus, but in that of quadrupeds. 2. That this fluid is alfo found in the fmall guts of the fœtus, but altered and digefted. 3. That there are alfo found in the larger inteftines real fæces, called meconium: fometimes the whole ilium is full of thefe. 4. That in the firft months, there is a great quantity of this fluid furrounding the fœtus: but in the latter months, there is but very little of it, and the confumption of it is not eafily accounted for any other way, than by its being fwallowed by the fœtus. 5. That the liquid itfelf is fo extremely proper for the nutrition of the fœtus, that a more fit one could not have been formed or defired. 6. That it feems to be continually preffed into the mouth, œfophagus, and ftomach of the fœtus, by the perpetual renitency of the uterus itfelf, and by the preffure of the mufcles of the abdomen, and of the ambient air.

Mr. Gibfon, in the Medical Effays of Edinburgh, has lately adopted this opinion as the moft probable. Hippocrates, among the antients, was of opinion, that the fœtus was nourifhed both by the mouth and by the umbilical veffels. He maintains, that the child, in the womb, with its lips compreffed together, attracts nourifhment; for which he affigns this reafon, that, unlefs the child had fucked in utero, it neither could depofit excrement, nor know how to fuck fo foon as it was born.

On the other hand, Dr. Monro, of Edinburgh, is of opinion, that the fœtus in viviparous animals, is nourifhed by the navel alone. He has given a curious differtation on this fubject in the Medical Effays, where he obferves, 1. That the fœtus is capable of receiving its whole nourifhment by the umbilical vein alone, whereas no fœtus can fubfift without the umbilical veffels. 2. That the liquor of the amnios is ill calculated in its natural ftate for the food of a fœtus, and becomes altogether unfit food in morbid cafes. 3. That it is highly improbable, that a creature fhould furnifh its fubfiftence out of its own body, which muft be the cafe, if the fœtus feeds on the liquor of the amnios,

amnios. 4. That it cannot be inferred from any refemblance of the liquor of the ftomach and amnios, nor from any other appearances, that the liquor of the amnios is ever fent down into the ftomach. 5. That no direct proof can be had of the liquor of the amnios being preffed or fwallowed down, but, on the contrary, all circumftances make it probable, that it does not go down. 6. That all the phænomena of a fœtus can moft reafonably be accounted for, without fuppofing the liquor of the amnios to be any part of its food: hence he thinks it reafonable to exclude the mouth from the office of conveying the aliment of the fœtufes of viviparous animals, and to believe that all their nourifhment is conveyed by the veffels. See Medical Effays, vol. II. page 102, *feq.*

Dr. Monro has, in thefe effays, given feveral other curious obfervations relating to the queftion about the nutrition of fœtufes of viviparous animals: he has alfo confidered the nourifhment of plants in a fœtus-ftate, and fhewn the analogy there is between thefe and the animal fœtufes. To fix the analogy between animals and plants, he obferves that the former may be faid to remain in the ftate of a fœtus, fo long as the young creature is folely nourifhed by liquors furnifhed by the uterus of the parent; and plants are to be confidered as fœtufes only, while the feed is ripening, and before the earth, water, moifture of the air, *&c.* have communicated immediately any matter for its increafe. Medical Effays, vol. II. page 201. *feq.*

To the queftion, Whence fœtufes have their red blood? Dr. Monro anfwers, that fœtufes in viviparous animals, have their red blood from the fame fource that chickens in the egg have theirs, which can be no other than the action of their heart, and of the veffels in their body and fecundines.

While fœtufes continue in the womb, their mufcles commonly act by their natural contraction, or the fœtus is faid to be in a ftate of fleeping: but fometimes, when its eafe or prefervation requires a change of fituation, it feems to perform fome voluntary motions which are called ftirrings. The human fœtus is generally fuppofed to be animated about the end of the fixth, or beginning of the feventh week after conception; though it is feldom felt to ftir, till towards the middle of the time of geftation.

Refpiration feems to be the great act by which the change is made in animals, from the ftate of fœtus, to that of motion, fenfation, and the other qualities of animal life in their larger degree. Mr. Duverney obferved this in the fœtus of a common fnake: he broke the egg of one of thefe animals, at a time when it was juft ready for hatching, and the young fnake fell out, rolled in a fpiral, at firft quite ftiff and motionlefs; but it had no fooner breathed three or four times, than it began to perform all the motions of animal life, in the moft nimble and active manner. See the article RESPIRATION.

Hippocrates and fome learned modern phyficians fuppofe, that a fœtus refpires in the womb; but it feems very difficult to conceive how air fhould traverfe the body of the mother, and the teguments of the child; and fince nature hath in new-born infants contrived peculiar temporary veffels, that the blood may circulate through other paffages than it does in the fame individuals, when they come to have the free ufe of their lungs, it is improbable that the fœtus in the womb fhould properly refpire.

The fymptoms of the human fœtus being dead in the womb, the reafons which may occafion it, the accidents which attend it, and the methods of preventing it, and remedying the confequences thereof, as alfo the various ways of expelling it, may be feen under the articles ABORTION, CONCEPTION, DELIVERY, *&c.*

For the circulation of the blood, as performed in the fœtus, fee CIRCULATION.

FOG, or MIST, a meteor confifting of grofs vapours, floating near the furface of the earth.

Mifts, according to lord Bacon, are imperfect condenfations of the air, confifting of a large proportion of the air, and a fmall one of the aqueous vapour; and thefe happen in the winter, about the change of the weather, from froft to thaw, or from thaw to froft: but in the fummer and the fpring, from the expanfion of the dew.

If the vapours, which are raifed plentifully from the earth and waters, either by the folar or fubterraneous heat, do, at their firft entrance into the atmofphere, meet with cold enough to condenfe them to a confiderable degree, their fpecific gravity is, by that means, encreafed; and fo they will be ftopped from afcending, and return back, either in form of dew, or drizzling rain; or remain fuf-

5 pended

pended some time in the form of a fog. Vapours may be seen on the high grounds as well as the low, but more especially about marshy places: they are easily dissipated by the wind, as also by the heat of the sun: they continue longest in the lowest grounds, because these places contain most moisture, and are least exposed to the action of the wind.

Hence we may easily conceive, that fogs are only low clouds, or clouds in the lowest region of the air; as clouds are no other than fogs, raised on high. See CLOUD. When fogs stink, then the vapours are mixt with sulphureous exhalations, which smell so. Objects viewed through fogs, appear larger and more remote than through the common air. Mr. Boyle observes, that upon the coast of Coromandel, and the most maritime parts of the East Indies, there are, notwithstanding the heat of the climate, annual fogs so thick, as to occasion those of other nations who reside there, and even the more tender part of the natives, to keep their houses close shut up.

FOGAGE, in the forest law, is rank grass not eaten up in summer.

FOGARES, a town of Transilvania, thirty miles north-east of Hermanstat.

FOGO, one of the Cape-Verd islands, subject to Portugal.

FOIL, among glass-grinders, a sheet of tin, with quicksilver or the like, laid on the backside of a looking-glass, to make it reflect. See the articles FOLIATING and GLASS.

FOIL, among jewellers, a thin leaf of metal placed under a precious stone, in order to make it look transparent, and give it an agreeable different colour, either deep or pale: thus, if you want a stone to be of a pale colour, put a foil of that colour under it; or if you would have it deep, lay a dark one under it.

These foils are made either of copper, gold, or gold and silver together: the copper foils are commonly known by the name of nuremberg or german foils; they are prepared as follows: procure the thinnest copper-plates you can get; beat these plates gently upon a well-polished anvil, with a polished hammer, as thin as possible; and placing them between two iron-plates as thin as writing-paper, heat them in the fire; then boil the foils, in a pipkin, with equal quantities of tartar and salt, constantly stirring them till by boiling they become white; after which, taking them out, and drying them, give them another hammering, till they are made fit for your purpose: however, care must be taken not to give the foils too much heat, for fear of melting, nor must they be too long boiled, for fear of attracting too much salt.

The manner of polishing these foils is as follows: take a plate of the best copper, one foot long and about five or six inches wide, polished to the greatest perfection; bend this to a long convex, fasten it upon a half roll, and fix it to a bench or table; then take some chalk, washed as clean as possible, and filtred through a fine linen-cloth, till it be as fine as you can make it; and having laid some thereof on the roll, and wetted the copper all over, lay your foils upon it, and with a polishing stone and the chalk, polish your foils till they are as bright as a looking-glass; after which they must be dried, and laid up secure from dust.

FOILING, among huntsmen, the footing and treading of a deer, that is on the grass and scarce visible.

FOLCLAND and FOLCMOTE. See the articles FOLKLAND and FOLKMOTE.

FOLD-NET, among sportsmen, a sort of net with which small birds are taken in the night, of which there are two sorts; the least may be managed by one man only, but the greatest must be carried by two, and used thus: let the net be fixed on both sides, to two strong, straight, and light poles about twelve feet long, each man holding one of them; let there be one behind them, at the distance of two yards, to carry lights: the nets must be carried between the wind and the birds, which all naturally roost on their perches with their breasts against the wind; by reason of this, he that beats the bushes on the other side of the hedge, will drive them out that way towards the light.

FOLDAGE, the liberty of penning sheep by night. See the article FALDAGE.

FOLDING *of sheep*. In some places they set their fold with several partitions, and put the wedders, ewes, and lambs separate by themselves. It is not good to fold them in rainy weather: and, as it is the opinion of some husbandmen that urine of sheep heats, helps and comforts the land as much or rather more than their dung does, they cause all the sheep in the fold to be raised before they let them go out, and go about the sides of the fold with a dog; for commonly when sheep see a dog come nigh them, they will dung and stale.

FOLIA, among botanifts, particularly fignify the leaves of plants; thofe of flowers being expreffed by the word petal. See the article PETAL.

FOLIACEUM EXPANSUM, in anatomy, a term applied to the extreme part of the fallopian tube, next the ovary, which is expanded like the mouth of a trumpet, and furrounded with a fort of fringe. See the article FALLOPIAN TUBE.

FOLIAGE, a clufter or affemblage of flowers, leaves, branches, *&c.*

FOLIAGE is particularly ufed for the reprefentations of fuch flowers, leaves, branches, rinds, *&c.* whether natural or artificial, as are ufed for enrichments on capitals, friezes, pediments, *&c.*

FOLIATE, in the higher geometry, a name given by Mr. de Moivre to a curve of the fecond order, expreffed by the equation $x^3+y^3=axy$; being a fpecies of defective hyperbolas with one afymptote, and confifting of two infinite legs croffing one another, and forming a fort of leaf.

FOLIATING *of looking-glaffes*, the fpreading the plates over, after they are polifhed, with quickfilver, *&c.* in order to reflect the image. It is performed thus: a thin blotting paper is fpread on the table, and fprinkled with fine chalk; and then a fine lamina or leaf of tin, called foil, is laid over the paper; upon this mercury is poured, which is to be diftributed equally over the leaf with a hare's foot, or cotton: over this is laid a clean paper, and over that the glafs-plate, which is preffed down with the right-hand, and the paper drawn gently out with the left: this being done, the plate is covered with a thicker paper, and loaden with a greater weight, that the fuperfluous mercury may be driven out, and the tin adhere more clofely to the glafs. When it is dried, the weight is removed, and the looking-glafs is complete.

Some add an ounce of marcafite, melted by the fire; and, left the mercury fhould evaporate in fmoke, pour it into cold water; and when cooled, fqueeze through a cloth, or through leather.

Some add a quarter of an ounce of tin and lead to the marcafite, that the glafs may dry the fooner.

Foliating of globe looking-glaffes, is done as follows: take five ounces of quickfilver, and one ounce of bifmuth; of lead and tin, half an ounce each: firft put the lead and tin into fufion, then put in the bifmuth, and when you perceive that in fufion too, let it ftand till it is almoft cold, and pour the quickfilver into it: after this, take the glafs-globe, which muft be very clean, and the infide free from duft; make a paper-funnel, which put into the hole of the globe, as near to the glafs as you can, fo that the amalgam, when you pour it in, may not fplafh, and caufe the glafs to be full of fpots; pour it in gently, and move it about, fo that the amalgam may touch every where. If you find the amalgam begin to be curdly and fixed, then hold it over a gentle fire, and it will eafily flow again. And if you find the amalgam too thin, add a little more lead, tin, and bifmuth to it. The finer and clearer your globe is, the better will the looking-glafs be.

Dr. Shaw obferves, that this operation has confiderable advantages, as being performable in the cold, and that it is not attended with the danger of poifonous fumes from arfenic, or other unwholfome matters, ufually employed for this purpofe: befides, how far it is applicable to the more commodious foliating of the common looking-glaffes, and other fpeculums, he thinks, may deferve to be confidered.

FOLIATION, a term ufed by fome botanifts to denote the corolla, or flower-leaves. See FLOWER and COROLLA.

FOLIO, in merchants books, denotes a page, or rather both the right and left hand pages, thefe being expreffed by the fame figure, and correfponding to each other. See BOOK.

FOLIO, among printers and bookfellers, the largeft form of books, when each fheet is fo printed, that it may be bound up in two leaves only.

This form is only ufed in large works; but the quarto or octavo forms are much more handy.

FOLIUM, LEAF, among botanifts. See the article LEAF.

FOLIUM INDICUM, INDIAN LEAF, in the materia medica, is an oblong, fmooth, and pointed leaf, of a grateful fmell. They agree in virtues with fpikenard, and are to be chofen frefh and greenifh. They are the produce of a fort of cinnamon. See the article CINNAMON.

FOLIUM BRANCHIARUM, among ichthyologifts, the leaf of the gills. See GILLS.

FOLKLAND, in antient law-writers, the fame with copyhold. See COPYHOLD.

FOLKMOTE, or FOLCMOTE, according to Kennet, was the common-council of all the inhabitants of a city, town, or borough:

borough: though Spelman will have the folkmote to have been a ſort of annual parliament or convention of the biſhops, thanes, aldermen, and freemen on every May-day. Dr. Brady, on the contrary, tells us, that it was an inferior court, held before the king's reeve, or his ſteward, every month, to do folk right.

FOLKSTONE, a market town of Kent, ſix miles weſt of Dover.

FOLLICLE, *folliculus*, among botaniſts, denotes a kind of ſeed-veſſel, like the conceptaculum. See CONCEPTACULUM.

FOLLICULUS FELLIS, the GALL-BLADDER. See the article GALL-BLADDER.

FOMAHANT, in aſtronomy, a ſtar of the firſt magnitude, in the conſtellation aquarius. See the article AQUARIUS.

FOMENTATION, in medicine, the bathing any part of the body with a convenient liquor; which is uſually a decoction of herbs, water, wine, or milk; and the applying of bags ſtuffed with herbs and other ingredients, which is commonly called dry fomentation.

Fomentations differ in little elſe from embrocations, but that they are moſtly made with aqueous menſtruums, are more extenſive in their manner of application, and are aſſiſted by actual heat, and hot woollen cloths: add to this, that fomentations, when general, or applied to every part of the body, are called baths. See the article BATH and EMBROCATION.

According to ſome, a fomentation is only a liquid epithem, applied hot. See the article EPITHEM.

Fomentations are to be looked on as partial bathings, applied only to a diſeaſed part, on which they have much the ſame effect as bathing has on the whole body. See the article BATHING.

FONCEAU, in the manege, the ſame with chaperon. See CHAPERON.

FONDI, a city and biſhop's ſee of Naples, in the province of Lavoro, about thirty-five miles north-weſt of Capua: eaſt long. 14° 20′, and north lat. 41° 35′.

FONT, among eccleſiaſtical writers, a large baſon, in which water is kept for the baptizing of infants, or other perſons.

It is ſo called probably becauſe baptiſm was uſually performed among the primitive chriſtians at ſprings or fountains. In proceſs of time the font came to be uſed, being placed at the lower end of the church, to intimate, perhaps, that baptiſm is the rite of admiſſion into the chriſtian church.

By the canons of the church of England, every church is to have a font made of ſtone; becauſe, ſays Durandus, the water which typified baptiſm in the wilderneſs, flowed from a rock; or rather, becauſe Chriſt is in ſcripture called the corner-ſtone, and the rock. See BAPTISM.

FONT, or FOUNT, among printers. See the article FOUNT.

FONTAINE, a town of Hainalt, fifteen miles eaſt of Mons.

FONTAINEBLEAU, a village of the iſle of France, about thirty miles ſouth-eaſt of Paris; remarkable for an elegant royal palace.

FONTANELLA, in anatomy, the quadrangular aperture, between the os frontis and oſſa ſincipitis, in infants juſt born, which is alſo called fons pulſatilis.

FONTANELLA, in ſurgery, the ſame with fonticulus. See FONTICULUS.

FONTARABIA, a port-town of Spain, in the province of Biſcay, twenty miles weſt of Bayonne: weſt lon. 1° 35′, and north lat. 43° 20′.

FONTENAYLE, a town of Orleanois, in France, about forty-ſix miles weſt of Poictiers.

FONTENOY, a town of Hainalt, ſituated three miles ſouth-eaſt of Tournay.

FONTEVRAUD, or *Order of* FONTEVRAUD, a religious order inſtituted about the latter end of the XIth century. By the rules of this order the nuns were to keep ſilence for ever, and their faces to be always covered with their veils; and the monks wore a leathern girdle, at which hung a knife and ſheath.

FONTICULUS, or FONTANELLA, in ſurgery, an iſſue, ſeton, or ſmall ulcer made in various parts of the body, in order to eliminate the latent corruption out of it. See ISSUE, SETON, *&c.*

FONTINALIA, in roman antiquity, a religious feaſt celebrated on October 13, in honour of the nymphs of wells and fountains. The ceremony conſiſted in throwing noſegays into the fountains, and putting crowns of flowers upon the wells. Scaliger, however, in his conjectures upon Varro, takes this not to have been a feaſt in honour of fountains in general, but of the fountain which had a temple at Rome, near the Porta Capena, called from thence Porta Fontinalis.

FONTINALIS, in botany, a genus of the cryptogamia claſs of moſſes; the male flower is almoſt ſeſſile in the alæ of the leaves; the anthera is roundiſh, with an open mouth, and covered with calyptræ.

FOOD implies whatever aliments are taken into

into the body, to nourifh it. See DIET, DRINK, ALIMENT, &c.

As the health of the human body evidently depends upon the quantity and quality of the blood and juices, it is plain that all thofe aliments which preferve and maintain a juft temperament and a due quantity of thefe are beneficial to health; and that fuch as have a contrary tendency are to be reckoned unwholefome. As to the nature of food with refpect to mankind in general, fome is of a good juice, and fome of a bad juice; the firft generates pure blood; the other bile, or an atrabilious humour. Moreover, fome forts of food are eafy of concoction, others difficult: fome loofen the belly, others bind it: and every fort is faid to be endued with fome peculiar virtue or property, the reafons of which are founded in nature.

As the blood, the nutritive juice, and in general all the parts of the body are made up of three elements, *viz.* of one which is fulphureous, oily, and inflammable; of one of an earthy, fubtile, alkaline nature; and of one of an aqueous nature: fo the feveral kinds and virtues of food may be moft commodioufly reduced to thefe three claffes; and aliments of thefe three feveral qualities, duly mixed with one another, afford a proper nourifhment for the human body.

The flefh of animals, efpecially when roafted, affords the body its principal fupply of the fulphureous part; but it is to be obferved, that wild animals are preferable in this refpect to the tame and domeftic kind, becaufe their oils and falts are exalted by habitual exercife. Among the aliments which furnifh the blood with its humid parts, of animals, fifh; and of vegetables, pot-herbs, the milder roots, and fome fummer-fruits are reckoned the principal. To the third clafs, which fupplies the blood with its fixed and earthy parts, belong all kinds of grains, as the feveral forts of bread, rice, peas, beans, lentils, chefnuts, almonds, cacao, cheefe, &c. From what has been faid, it will appear that all fuch aliments as are of a mild quality, and refemble the chyle and blood, are fit for nourifhment; that all fuch food as either recedes from, or is quite oppofite to the nature of the chyle and blood, is unfit for nourifhing the parts; that all food in which there is too much of an acid, is improper for nourifhment, becaufe milk and blood will not mix with an acid, which is quite oppofite to their natures, and induces a coagulation of the circulating juices; that all falts, and all foods too highly falted, muft be unfit for nourifhment, becaufe no falt whatever can be mixed with the blood, chyle, and milk; and laftly, that the free ufe of fpirits muft be very detrimental both to health and nourifhment, becaufe blood and chyle never incorporate with fpirituous liquors, but rather feparate from them.

Foods proper for preferving health ought not only to contain a laudable juice, but fhould likewife be eafily diffolved by the ftomach: hence it is plain, that all thofe kinds of food, which on account of the clofenefs and compactnefs of their texture, are with difficulty diffolved, are for that very reafon lefs conducive to health. Again, as it is neceffary to the performance of the office of nutrition, that the fmall mouths of the internal rough coat of the inteftines abforb the chyle, and convey it to the blood, none of thofe foods which either obftruct or too much corrugate its mouths, can be ufed, without in fome meafure injuring health. And as the effete mafs of foods, drained and exhaufted by the feparation of the chyle from it, ought by the expanfive and contractive motion of the inteftines, to be thrown off from them; it muft of courfe follow, that all thofe foods are prejudicial to health, which either pafs through the inteftines with difficulty, ftop their motions, or weaken their tone and impair their ftrength by fuppreffing excretion, fo neceffary to health. This characteriftic of unwholefomenefs belongs to all aftringent, mouldy, glutinous, vifcid, auftere foods, to all unripe fummer-fruits, and in general to all fuch aliments as are eafily reducible to a firm coagulum, which, by adhering immoveably to the coats of the inteftines, and incruftating the orifices of their fmall abforbent veffels, occafion copious flatulencies and fpafms. The unwholefomenefs of food is alfo to be eftimated from their impairing the fermentative and folutive powers of the ftomach, fince by that means crudities are generated. Upon the whole, however, it muft be obferved, that for different intentions, different kinds of foods are required, in which age, conftitution, climate, feafon of the year, and numberlefs other confiderations are to be included; and that abftinence and exercife muft conduce with every kind of food, for the prefervation of health; and that where exercife is

wanting,

wanting, as in ftudious perfons, the defect muft be fupplied with abftinence.

The quantity of food alfo muft vary according to age, feafon, conftitution, and nature of the food itfelf. Some phyficians fay, that in winter, where the perfpiration of an unexercifed perfon is only equal to the urine, the food for twenty-four hours ought not to exceed four pounds, or four pounds and a half. In fummer, the food may be fix pounds and an half, which may be carried off without the help of exercife, when the air is hot and dry. Dr. Bryan Robinfon thinks, that if the quantity of food be fuch as to make the perfpiration and urine of a natural day always nearly equal, and the morning-weight of the body always nearly the fame, that quantity is the truly healthful quantity of food for grown perfons who ufe but little exercife. The fame author thinks, that the quantity of food neceffary to keep a grown body in health, will be better and more eafily digefted, when it is fo divided as to make the meals equal, than when they are very unequal: that good and conftant health confifts in a juft quantity of food, and a juft proportion of the meat to the drink: and that to be freed from chronical diforders contracted by intemperance, the quantity of food ought to be leffened, and the proportion of the meat to the drink increafed more or lefs, according to the greatnefs of the diforders.

FOOL, according to Mr. Locke, is a perfon who makes falfe conclufions from right principles; whereas a madman, on the contrary, draws right conclufions from wrong principles. See REASON and UNDERSTANDING.

FOOL's STONES, in botany, a name given to the orchis. See ORCHIS.

FOOT, *pes*, a part of the body of moft animals whereon they ftand, walk, *&c.* Animals are diftinguifhed, with refpect to the number of their feet, into *bipedes*, two-footed; fuch are men and birds: *quadrupedes*, four-footed; fuch are moft land-animals: and *multipedes*, or many-footed, as infects. The reptile-kind, as ferpents, *&c.* have no feet; the crab-kind of fifh have got ten feet, but moft other fifhes have no feet at all: the fpider, mites, and polypufes have eight; flies, grafshoppers, and butterflies have fix feet. Animals deftined to fwim, and water-fowl, have their toes webbed together, as the phocæ, goofe, duck, *&c.* The fore-feet of the mole, rabbit, *&c.* are wonderfully formed for digging and fcratching up the earth, in order to make way for their head.

FOOT, in anatomy. The greater foot denotes the extent from the juncture of the hip to the toe-ends, and is divided into the thigh, the leg, and the foot, properly fo called. See THIGH and LEG.

The leffer foot, or that properly fo called, is divided into four parts, *viz.* the tarfus, the metatarfus, the toes, and the offa fefamoida. See the articles TARSUS, METATARSUS, TOES, and SESAMOIDA OSSA.

In examining the foot, we are to confider its length, which is greater in man than in any other animal, in order to ferve for his treading the firmer. It is alfo to be remarked, that the under part, or fole, called planta, is contrived hollow in man, left the veffels fhould be preffed on in walking, as we prefs there with our whole weight, whilft we are in this pofture. See the article PLANTA.

FOOT, in the latin and greek poetry, a metre or meafure, compofed of a certain number of long and fhort fyllables.

Thefe feet are commonly reckoned twenty-eight, of which fome are fimple, as confifting of two or three fyllables, and therefore called difyllabic or trifyllabic feet; others are compound, confifting of four fyllables, and are therefore called tetrafyllabic feet.

The diffyllabic feet are four in number, *viz.* the pyrrhichius, fpondeus, iambus, and trocheus. See PYRRHICHIUS, *&c.*

The trifyllabic feet are eight in number, *viz.* the dactylus, anapæftus, tribrachys, moloffus, amphybrachys, amphimacer, bacchius, and antibacchius. See DACTYL, *&c.*

The tetrafyllabic are in number fixteen, *viz.* the proceleufmaticus, difpondeus, coriambus, antifpaftus, diiambus, dichoreus, ionicus a majore, ionicus a minore, epitritus primus, epitritus fecundus, epitritus tertius, epitritus quartus, pæon primus, pæon fecundus, pæon tertius, and pæon quartus. See the articles PROCELEUSMATICUS, *&c.*

There are feveral other forts of feet invented by idle grammarians, of five, fix, or more fyllables, but they are not worth the reciting. The number of feet each fort of verfe contains, will be found under that particular verfe. See the articles HEXAMETER, *&c.*

Even and odd FOOT, in poetry, is a foot fo denominated in refpect of its fituation

in

in the verſe: thus, the firſt, third, and fifth foot of the verſe are uneven. This denomination of feet chiefly obtains in iambic verſe. See IAMBIC.

FOOT is alſo a long meaſure, conſiſting of 12 inches. See the article INCH.

Geometricians divide the foot into 10 digits, and the digit into 10 lines. See the articles DIGIT and LINE.

FOOT *ſquare*, is the ſame meaſure, both in breadth and length, containing 144 ſquare or ſuperficial inches.

Cubic, or *Solid* FOOT, is the ſame meaſure in all the three dimenſions, length, breadth, and depth or thickneſs, containing 1728 cubic inches.

The foot is of different lengths in different countries. The paris royal foot exceeds the engliſh by nine lines; the antient roman foot of the Capitol, conſiſted of 4 palms, equal to $11\frac{7}{10}$ inches engliſh; rhineland or leyden foot, by which the northern nations go, is to the roman foot as 950 to 1000. The proportions of the principal feet of ſeveral nations, compared with the engliſh, are as follow.

The engliſh foot being divided into 1000 parts, or into 12 inches, the other feet will be as follow:

	1000 parts.	Feet.	inch.	lines.
London-foot —	1000	0	12	0
Amſterdam —	942	0	11	3
Antwerp — —	946	0	11	2
Bologna — —	1204	1	2	4
Bremen —	964	0	11	6
Cologne — —	954	0	11	4
Copenhagen —	965	0	11	6
Dantzick —	944	0	11	3
Dort — —	1184	1	2	2
Frankfort on the Main	948	0	11	4
The Greek —	1007	1	0	1
Lorrain — —	958	0	11	4
Mantua —	1569	1	6	8
Mechlin — —	919	0	11	0
Middleburg —	991	0	11	9
Paris royal —	1068	1	0	9
Prague — —	1026	1	0	3
Rhineland or Leyden	1033	1	0	4
Riga — —	1831	1	9	9
Roman —	967	0	11	6
Old Roman —	970	0	11	8
Scotch — —	1005	1	0	$\frac{5}{7}$
Straſburg —	920	0	11	0
Toledo — —	899	0	10	7
Turin — —	1062	1	0	7
Venice — —	1162	1	1	9

FOOT *of a horſe*, in the manege, the extremity of the leg, from the cornet to the lower part of the hoof.

The four feet of a horſe are diſtinguiſhed by four different names: the far fore-foot denotes the right foot before; and the near fore-foot, the ſtirrup-foot, and the bridle-hand-foot, are uſed to ſignify the left foot before: of the two hinder feet, the right is called the far hind-foot, and the left hind-foot is called the near foot behind.

It is a great imperfection in a horſe to have feet too large and fat, as alſo to have them too little: the former ſort of horſes are, for the moſt part, heavy, and apt to ſtumble; on the other hand, too ſmall feet are to be ſuſpected, becauſe they are often painful, and ſubject to cloven quarters and other imperfections.

FOOT DEROBE, in the manege. A horſe's foot gets this appellation, when it is worn and waſted by going without ſhoes, ſo that for want of hoof it is a hard matter to ſhoe him.

Fat FOOT, in the manege. A horſe is ſaid to have a fat foot, when the hoof is ſo thin and weak, that, unleſs the nails be driven very ſhort, he runs the riſque of being pricked in ſhoeing. The engliſh horſes are very ſubject to this diſorder.

FOOT-BANK, or FOOT-STEP, in fortification, the ſame with banquette. See the article BANQUETTE.

FOOT *of the foreſt*, *pes foreſtæ*, in our antient cuſtoms, contained 18 inches, or $1\frac{1}{2}$ of the common foot. See FOREST.

FOOT-GUARDS. See GUARDS.

FOOT-GELD, or FAUT-GELD, in our old cuſtoms, an amercement laid upon thoſe who live within the bounds of a foreſt, for not lawing or cutting out the ball of their dog's feet. To be free of a foot-geld, was a privilege to keep dogs unlawed, within the bounds of a foreſt.

FOOT-HOOKS, or FUTTOCKS. See the article FUTTOCKS.

FOOT-HUSKS, among botaniſts, ſhort heads out of which flowers grow.

FOOT-LEVEL, among artificers, an inſtrument that ſerves as a foot-rule, a ſquare, and a level. See the articles LEVEL, RULE and SQUARE.

FOOT-PACE, or HALF-PACE, among carpenters, a pair of ſtairs, whereon, after four or ſix ſteps, you arrive at a broad place, where you may take two or three paces before you aſcend another ſtep. The deſign of which is to eaſe the legs

in ascending the rest of the steps. See the article STAIR-CASE.

FOOT-SOLDIERS. See INFANTRY.

Fore-FOOT, in the sea language, the foremost part of the keel, which first takes the ground.

FORAGE, all kind of provision for cattle, especially for horses in time of war. See the article FORAGE.

FORAMEN, in anatomy, a name given to several apertures, or perforations in divers parts of the body; as, 1. The external and internal foramina of the cranium or skull. 2. The foramina in the upper and lower jaw. 3. Foramen lachrymale. 4. Foramen membranæ tympani. See the articles SKULL, JAW, LACHRYMAL, EAR, *&c.*

FORAMEN OVALE, an oval aperture or passage through the heart of a fœtus which closes up after birth. It arises above the coronal vein, near the right auricle, and passes directly into the left auricle of the heart, serving for the circulation of the blood in the fœtus, till such time as the infant breathes and the lungs are open; it being generally reckoned one of the temporary parts of the fœtus, wherein it differs from an adult, altho' almost all anatomists, Mr. Cheselden excepted, assure us, that the foramen ovale has sometimes been found open in adults. See FOETUS and CIRCULATION.

The foramen ovale therefore, and the canal of communication in the fœtus are in reality no other than a sort of subsidiary parts to the lungs formed only for a certain time, and to become useless and disappear when the act of respiration has given the turn to the circulation of the blood, which it is to retain through the whole life of the animal. Dr. Trew affirms, that the membrane of the foramen ovale is so placed, as to permit the blood to pass freely from the right auricle to the left, during the diastole of the auricles, but never from the left auricle to the right. See Phil. Transf. n° 457.

FORCALQUIER, a town of Provence, in France, thirty miles north of Aix.

FORCE, in mechanics, denotes the cause of the change in the state of a body when being at rest its begins to move, or has a motion which is either not uniform, or not direct.

Mechanical forces may be reduced to two sorts, one of a body at rest, the other of a body in motion.

The force of a body at rest is that which we conceive to be in a body lying still on a table, or hanging by a rope, or supported by a spring, and is called by the names of *pressure*, *vis mortua*, &c. The measure of this force being the weight with which the table is pressed, or the spring bent. See INERTIA.

The force of a body in motion, called *moving force*, *vis motrix*, and *vis viva*, to distinguish it from the *vis mortua*, is allowed to be a power residing in that body so long as it continues its motion, by means of which it is able to remove obstacles lying in its way, to surmount any resistance, as tension, gravity, friction, *&c.* and which in whole, or in part, continues to accompany it so long as the body moves. Philosophers are fully agreed about the measure of the first of these forces, *viz.* *vis mortua*, notwithstanding the deversity of appellations by which it is called; but about the measure of the last sort of force, or *vis viva*, they are divided into two parties.

The newtonians and cartesians maintain, that the moving force of bodies is in the compound ratio of their weights and velocities; and Leibnitz with his followers, pretend it to be in the compound ratio of the weights and the squares of the velocities. Those who hold the first opinion, lay down for a principle that when two bodies meet one another in contrary directions, if their moving forces be equal, neither body will prevail over each other: and if their moving forces be unequal, the stronger will always prevail over the weaker. But the followers of Leibnitz deny the truth of this principle, and lay down others, which, as they pretend, are more clear and satisfactory; such as, that it always requires a determinate degree of force to bend a given spring to a given degree, whether this be performed in a longer or shorter time, or vice versa, and that a given spring bent to a given degree always communicates the same force to a body by unbending itself, whether the time it takes to unbend itself be longer, or shorter. But these propositions are alike denied by the Newtonians.

Now if the principle of the former be admitted as true, *viz.* that those bodies have equal forces, which meeting each other in contrary directions do not prevail over each other, it cannot be disputed that bodies which have equal quanti-

quantities of motion have alſo equal forces; and conſequently that the moving forces of bodies are in a compound ratio of their maſſes and velocities. On the other hand, if the principles of the Leibnitians be admitted, it is no leſs indiſputable that the forces of moving bodies will be in a compound ratio of their maſſes and the ſquares of their velocities. Thus let M and m denote the maſſes of two bodies, V and v their velocities; then if any ſpring bent to a certain degree give the body M a certain velocity V, the ſame ſpring bent to the ſame degree will never give another body m a velocity v, ſo that M V ſhall be equal to $m\,v$; but will always communicate ſuch a velocity to m, that M V V ſhall be equal to $m\,v\,v$. And this is admitted by the newtonians, tho' the concluſion that the forces of the bodies M and m are equal, is denied. To put an end therefore to this controverſy, other principles muſt be found; and accordingly many ſubtile reaſonings have been formed by ſeveral authors, concerning the nature of action, cauſe, effect, time, ſpace, *&c.* by which we believe more readers have been confounded than enlightened; ſo that after all, the controverſy ſtill ſubſiſts, though carried on near eighty years, during which time a great many pieces have been publiſhed on both ſides of the queſtion, and a great many experiments have been made, or propoſed to be made, in order to decide it; becauſe tho' both parties agree in the event of the experiments, whether actually made or only propoſed, yet as the writers on each ſide have found a way of deducing from thoſe experiments a concluſion ſuitable to their own opinion, the diſagreement ſtill continues as wide as ever, and muſt remain ſo, while the newtonians, on the one hand, aſſume that *equal preſſures in equal times produce equal moving forces*; and the leibnitians, on the contrary, maintain *that equal preſſures urging a body through equal ſpaces, produce equal forces.* Hence, ſuppoſing equal preſſures to act on equal bodies, either to produce motion in them, or to ſtop what motion they have, the queſtion will be whether the force generated or deſtroyed be proportional to the time the preſſure acts, or the ſpace thro' which it acts. For example, let two equal bodies, with velocities as 1 and 2, aſcend againſt the action of uniform gravity according to Galileo's hypotheſis, it is certain that the body whoſe velocity is 2 will reſiſt the force of gravity twice the time that the body whoſe velocity is only 1 can do: and it is no leſs certain, that the body whoſe velocity is 2 will aſcend to four times the height that the other can. So that if we meaſure the forces of theſe bodies by the preſſure and time requiſite to deſtroy their motion, theſe forces will be as the velocities of the moving bodies; but if we meaſure the forces by the preſſure and ſpace through which it extends, requiſite to deſtroy thoſe forces, we ſhall find them proportional to the ſquares of the velocities of the moving bodies. This holds in uniform preſſures, but if the preſſure be not uniform as in the action of ſprings, which preſs more or leſs as they are more or leſs bent, we muſt then have recourſe to the fluxions of the ſpace and time. Thus if p ſtand for the preſſure, t for the time, and s for the ſpace, the fluxion, or infiniteſimal element of the velocity, will, according to both parties, be expreſſed by $p\,\dot{t}$. According to the newtonians, this is alſo the fluxion or element of the force; but according to the followers of Leibnitz, the element of the force is proportional to $p\,\dot{s}$. This being the caſe, we ſhall only remark that we have not met with any concluſive argument on either ſide, nor do we believe it poſſible to demonſtrate the one or the other of theſe aſſertions till ſome body ſhall be metaphyſician enough to analyſe the notions of force, action, time, and ſpace, farther than has been hitherto done. Some leibnitians do not aſſume it as a firſt principle, that action of force is proportional to the preſſure and ſpace; but they ſay, that a preſſure being given, its action will be proportional to the velocity of the point moved by that preſſure. Hence they infer, that the whole action of a preſſure is as its intenſity, as the velocity of the point to which it is applied, and as the time the preſſure acts. And ſpace being as the time and velocity, they conclude the action of a preſſure to be as that preſſure, and the ſpace thro' which it acts. Thus 'S Graveſande, lib. 2. cap. 2. ſect. 728, ſays, if a point runs thro' a determinate ſpace A B, and preſſes with a certain given force or intenſity of

A C B

preſſure, it will perform the ſame action whether it move faſt or ſlow, and therefore

fore the time of the action in this case ought not to be regarded. But the newtonians do not submit to this reasoning, and insist, that we cannot abandon the old doctrine concerning the measures of the forces of bodies in motion, without exchanging plain principles that have been generally received concerning the actions of bodies, upon the most simple and uncontested experiments, for notions that seem at best but very obscure. Let A and B (plate CI. fig. 2. n° 1.) be two equal bodies that are separated from each other by springs interposed between them (or in any equivalent manner) in a space E F G H, which in the mean time proceeds uniformly in the direction B A, in which the springs act, with a velocity as 1, and suppose that the springs imprint on the equal bodies A and B equal velocities in opposite directions that are each as 1. Then the absolute velocity of A (which was as 1) will be now as 2; and, according to the new doctrine of the leibnitians, its force as 4. Whereas the absolute velocity and the force of B (which was as 1) will be now destroyed; so that the action of the springs adds to A a force as 3, and subducts from the equal body B, a force as 1 only; and yet it seems manifest that the actions of the springs on these equal bodies ought to be equal. In general, if m represent the velocity of the space E F G H in the direction B A, n the velocity added to that of A and subducted from that of B by the action of the springs, then the absolute velocities of A and B will be represented by $m + n$ and $m - n$ respectively, the force added to A by the springs will be $2mn + nn$, and the force taken from B will be $2mn - nn$ which differ by $2nn$. Further, it is allowed that the actions of bodies upon one another are the same in a space that proceeds with an uniform motion, as if the space was at rest. But if the space E F G H was at rest, the forces communicated by the springs to A and B had been equal, and the force of each had been represented by nn. These arguments, says Mr. Maclaurin, are simple and obvious, and seem on that account to be the more proper, in treating this question. Tho' there are certain effects (continues the same author) produced by the forces of bodies that are in the duplicate ratio of their velocities, we are not thence to conclude that the forces themselves are in that ratio, no more than we are to conclude that a force which would carry a body upwards of 500 miles in a minute is infinite, because it may be demonstrated, if we abstract from the resistance of the air, that a body projected with this velocity would rise for ever, and never return to the earth. And as reaction is only equal to action when both are estimated in opposite directions upon the same right line, so we are never to estimate the force which one body loses or acquires by that which is produced or destroyed in another body in a different direction.

Mr. Euler observes, with respect to this dispute concerning the measure of vivid force, that we cannot absolutely ascribe any force to a body in motion, whether we suppose this force proportional to the velocity, or to the square of the velocity: for the force exerted by a body striking another at rest is different from that which it exerts in striking the same body in motion; so that this force cannot be ascribed to any body considered in itself, but only relatively to the other bodies it meets with. There is no force in a body absolutely considered but its inertia, which is always the same, whether the body be at rest or in motion. But if this body be forced by others to change its state, its inertia then exerts itself as a force properly so called, which is not absolutely determinable, because it depends on the changes that happen in the state of the body. Suppose, for instance, a body A forced to move in an incurvated tube or along the curve surface E a F, (*ibid.* n° 2.) the body in this case will press the surface wherever it touches it in a direction a a normal to the curve; and with a certain force commonly determined in mechanics, by the mass of the body, its velocity, and by the radius of curvature O a. Now the body exerts a pressure or *vis mortua*, yet it would be absurd to ascribe a certain and determinate force of pressure to this body considered in itself, since this pressure may vary very much according to the difference of the curvature of E a F. In like manner, it seems unreasonable to place a certain absolute force of percussion in bodies, since it principally depends on the external circumstances accompanying the shock. A second observation which has been made by several great men is, that the effect of a shock of two or more bodies is not produced in an instant, but requires a certain inter-

val of time. If this be so, the heterogeneity between the *vires vivæ* and *mortuæ* vanishes; since a pressure may always be assigned, which in the same time, however little, shall produce the same effect. If then the *vires vivæ* be homogeneous to the *vires mortuæ*, and since we have a perfect measure and knowledge of the latter, we need require no other measure of the former than that which is derived from the *vires mortuæ* equivalent to them.

Mr. Euler has also given some calculations with respect to the force of percussion resulting from the pressures which elastic and non elastic bodies exert on each other while the collision lasts, determining these pressures for every instant of the shock; and where the bodies are very hard, he finds the force of percussion to be in a compound ratio of the velocity, and of the subduplicate ratio of the mass of the striking body; so that in this case neither the Leibnitian, nor the Cartesian proportions take place. But as we cannot pretend to give a full account of this controversy, we must refer the curious to Mr. Euler's dissertations in the Memoirs of the Academy of Berlin, and to some of the principal authors on each side of the question, such as Sir Isaac Newton, Mr. Maclaurin, Dr. Jurin, Dr. Pemberton, Mr. Robins, Mons. de Mairan, &c. in favour of the old opinion; Mess. Leibnitz, Bernoulli, Herman, Poleni, Wolfius, 'S Gravesande, &c. in support of the new; and shall only observe in this place, that the experiments of Desaguliers, Poleni, &c. tho' they do not decide the controversy, are nevertheless of great use, and that whatever may be said of the metaphysical part, it is certain, that no useful conclusion in mechanics is affected by the disputes concerning the mensuration of the force of bodies in motion, as has been objected to mathematicians by the analyst in Query IX.

Accelerating FORCE. See ACCELERATING.

Central FORCE. See CENTRAL.

Centrifugal FORCE. See CENTRIFUGAL.

Centripetal FORCE. See CENTRIPETAL.

FORCE *of inactivity*. See INERTIA.

FORCE *of wind*. See WIND.

FORCE, in law, signifies any unlawful violence offered to things or persons, and is divided into simple and compound. *Simple force* is what is so committed, that it has no other crime attending it, as where a person by force enters on another's possession without committing any other unlawful act. *Compound force*, is where some other violence is committed with such an act which, of itself alone is criminal; as if one enters by force into another's house, and there kills a person, or ravishes a woman. There is likewise a force implied in law, as in every trespass, rescous or disseisin, and an actual force with weapons, number of persons, &c. Any person may lawfully enter a tavern, inn, or victualling-house; so may a landlord his tenant's house to view repairs, &c. But if, in these cases, the person that enters commits any violence or force, the law will intend that he entered for that purpose.

Fresh FORCE. See the article FRESH.

FORCEPS, a pair of nippers, or pinchers, for laying hold of and pulling out any thing forced into another body.

FORCEPS, in surgery, &c. a pair of scissars for cutting off, or dividing, the fleshy or membranous parts of the body, as occasion requires. See SCISSARS.

A surgeon should be well provided with these; some straight, and of different sizes, like common scissars; others crooked, proper to be used in fistulæ, and in many other cases, (see plate CI. fig. 3. n° 1.) and others, again, furnished with teeth at one end, used to remove dressings, to extract musket balls, splinters, thorns, &c. and on many other occasions, (*ibid.* n° 2.)

Forcepses are commonly made of steel, but those of silver are much neater.

FORCER, or FORCING-PUMP, in mechanics, is a kind of pump in which there is a forcer or piston without a valve. The forcing pump consists of a barrel A B C (plate CI. fig. 4. n°. 1.) in which there is a forcer I, which moves up and down in it. The barrel communicates with two pipes, the one called a sucking-pipe B C, which goes down into the well, and the other called a forcing-pipe F G, which goes upwards. There are two valves, the one D, at any place of the pipe B C, and the other E, in the pipe F G; both which let the water go up, and hinder it from coming down. Then when the forcer is moved upwards, as it rarifies the air in the pipe B C, (for the valve E hinders the outward air which presses upon it from going thro') the water rises in it, till after several strokes it comes to the forcer: then at every time the forcer goes down, the water that is pressed downwards being hindered

hindered from going thro' the valve D, opens the valve E, and goes up the pipe F G. When the forcer goes up again, then the water in the pipe F G ſhuts by its preſſure the valve E, and conſequently the water in the well riſes up the pipe B E, and the ſame happens at every motion of the forcer. It is to be obſerved in the forcing pump, that the nearer the forcer comes to the well, the better it is, for the ſame reaſon as in the ſucking pump. See the article PUMP.

There are ſeveral ways of making forcers: the moſt common of all conſiſts of a braſs-cylinder, a very little leſs in the diameter than the bore of the barrel (*ibid.* n° 2.) at the top B and at the bottom D, and turned leſs ſtill at the middle C C in order to let in a leathern collar E E (*ibid.* n° 3.) which makes it juſt equal to the bore of the barrel, ſo as to fit it quite when it is put into it. The ſecond ſort of forcers conſiſts of three braſs cylinders A, B, C, (*ibid.* n° 4, 5, 6) which can be ſcrewed together. The middle one B ought to be almoſt equal in diameter to the bore of the pipe, ſo as to ſlide in it without any friction. The upper A and the lower C muſt be a little leſs and equal to one another. There are two leathers, D and E, (*ibid.* n° 7, 8.) which muſt be put between them when they are unſcrewed. Then it is evident, that if the cylinders be ſcrewed together, and the leathers apply themſelves folding upwards round the upper part A, and downwards round the lower C, they will become juſt equal to the bore of the barrel, and conſequently they will hinder any air from getting thro' the ſides of the forcer when it moves up and down in the barrel. The uſe of the middle braſs cylinder B is to hinder the leathers from turning themſelves back by the motion.

But the beſt way of making forcers is to have a plunger, or ſolid braſs-cylinder A (*ibid.* n° 9.) equal in length to the barrel, and a little leſs in diameter than the bore, ſo that it can move freely in it without any friction: there muſt be two hollow ſhort braſs rings C C, D D, (*ibid.* n° 10, 11.) at the top of the barrel F, (*ibid.* n° 12.) which can be ſcrewed together. The upper one C C muſt be equal in bore to it, and the lower D a little leſs. There are two leathers as in (n° 7, 8.) both having in the middle a leſs hole than the bore of the pipe. The one muſt be applied between the barrel and the ring D, and the other between the ring D and the upper one C, and the whole muſt be ſcrewed together. Then if the ſolid cylinder A (n° 9.) be put into it and moved up and down, it is evident that the forementioned leathers which are applied the one to the barrel, the other to the inſide of the hollow cylinder C will hinder any air from getting between them and the ſolid cylinder A. The advantage of this kind of forcers is, that they have no other friction but at the top of the barrel, and that the inſide of the barrel need not be ſmooth as in other kinds of pumps, but only the outſide of the forcer A muſt be turned true and poliſhed, which can be done a great deal eaſier. The lower part of the forcer A muſt be turned a little conical, that it may be brought into the barrel, without any reſiſtance of the upper leather of the above-mentioned collar or jack-head. See the article PISTON.

FORCHAIN, a town of Franconia, in Germany, ſixteen miles ſouth of Bamberg.

FORCIBLE, in law, ſomething done illegally. See the article FORCE.

A FORCIBLE *entry*, is a violent and actual entry into houſes, or lands; and a forcible detainer, is where one by violence with-holds the poſſeſſions of lands, *&c.* ſo that the perſon who has a right of entry is barred, or hindered therefrom.

At common law, any perſon that had a right to enter into lands, *&c.* might retain poſſeſſion of them by force. But this liberty being abuſed, to the breach of the peace, it was therefore found neceſſary that the ſame ſhould be reſtrained. Tho' at this day, he who is wrongfully diſpoſſeſſed of goods may by force retake them. By ſtatute, no perſon ſhall make an entry on any lands or tenements, except where it is given by law, and in a peaceable manner, even though they have title of entry, on pain of impriſonment; and where a forcible entry is committed, juſtices of peace are authorized to view the place, and enquire of the force by a jury, ſummoned by the ſheriff of the county: and they may cauſe the tenements, *&c.* to be reſtored, and impriſon the offenders till they pay a fine. Likewiſe a writ of forcible entry lies, where a perſon ſeized of freehold, is by force put out thereof. See ENTRY.

FORCIBLE MARRIAGE of a woman having eſtates in lands, *&c.* is felony by law, and

and the takers, procurers, abettors, and receivers of the woman so taken away against her will, and knowing the same, are likewise deemed principal felons; but as to the procurers and abettors, they must be such before the fact committed, to be excluded benefit of clergy.

FORCING, among gardeners, signifies the making trees produce ripe fruit before their usual time. This is done by planting them in a hot bed against a south-wall, and likewise defending them from the injuries of the weather by a glass frame. They should always be grown trees, as young ones are apt to be destroyed by this management. See HOT-BED. The glasses must be taken off at proper seasons, to admit the benefit of fresh air, and especially of gentle showers.

FORCING OF WINE. See WINE.

FORCING-PUMP. See FORCER, *supra.*

FORE-CASTLE *of a ship*, that part where the foremast stands. It is divided from the rest by a bulk-head. See the article SHIP.

FORE-CLOSED, in law, signifies the being shut out, and excluded, or barred, the equity of redemption on mortgages, *&c.*

FORE-FOOT, in the sea-language, signifies one ship's lying, or sailing, cross another's way: as if two ship's being under sail, and in ken one of another, one of them lying in her course with her stem so much a weather the other, that holding on their several ways, neither of them altering their courses, the windward ship will run a head of the other: then it is said, such a ship lies with the other's forefoot.

FOREIGN, something extraneous, or that comes from abroad.

FOREIGN, in our law, is used in various significations. Thus,

FOREIGN ATTACHMENT is an attachment of the goods of foreigners, found within a city, or liberty, for the satisfaction of some citizen, to whom the foreigner is indebted; or it signifies an attachment of a foreigner's money in the hands of another person. See ATTACHMENT.

FOREIGN KINGDOM, a kingdom under the dominion of a foreign prince.

At the instance of an embassador, or consul, an offender against the laws here may be sent for hither from a foreign kingdom. And where a stranger of Holland, or any foreign country, buys goods at London, for instance, and there gives a note under his hand for payment, after which he goes away privately into Holland; in that case, the seller may have a certificate from the lord mayor, on the proof of the sale and delivery of such goods, whereupon a process will be executed on the party in Holland.

FOREIGN MATTER, any thing which is done, and, therefore, triable in another country.

FOREIGN OPPOSER, or APPOSER, an officer in the exchequer, that apposes, or makes a charge on all sheriffs, *&c.* of their green wax: that is to say, fines, issues, amerciaments, recognizances, *&c.*

FOREIGN PLEA, signifies an objection to the judge of the court, by refusing him as incompetent, because the matter in question is not within his jurisdiction. All foreign pleas that are triable by the country on any indictment for murder, or felony, shall be tried, without delay, before the justices, where the party is arraigned, and by the jurors of the same county, though the matters of such pleas are alledged to be in any other county or counties: but this does not extend to treason, nor to appeals; a foreign issue wherein must be tried, as formerly, by a jury of that county where the fact is laid. If a foreign plea is pleaded in a civil action, the court generally makes the defendant put it in upon oath that the same is true, or will cause judgment to be entered for want of a plea.

FOREIGN SERVICE, that service by which a mean lord holds of another without the compass of his own fee; or it is that which the tenant performs either to his own lord, or the lord paramount, out of the fee.

FOREIGN SEAMEN serving two years on board british ships, whether of war, trade, or privateers, during the time of war, shall be deemed natural-born subjects.

FOREIGNER, the natural-born subject of some foreign prince.

Foreigners, tho' made denizens, or naturalized, are disabled to bear any office in the government, to be of the privy-council, or members of parliament, *&c.* This is by the acts of the settlement of the crown. Such persons as are not freemen of a city, or corporation, are also called foreigners, to distinguish them from the members of the same.

FOREJUDGER, in law, signifies a judgment, whereby one is deprived or put by a thing in question.

To be forejudged the court is where an officer, or attorney, of any court, is expelled

pelled the ſame, for male-practice; or for not appearing to an action on a bill filed againſt him, &c. And where an attorney of the common pleas is ſued, the plaintiff's attorney delivers the bill to one of the criers of the court, who calls the attorney defendant, and ſolemnly proclaims aloud, that if he does not appear thereto, he will be forejudged; likewiſe a rule is given by the ſecondary for his appearance, and if the attorney appears not in four days, then the clerk of the warrants ſtrikes ſuch an attorney off the roll of attornies; after which he becomes liable to be arreſted like any other perſon: but where an attorney is forejudged, he may be reſtored on clearing himſelf from his contumacy, and making ſatisfaction to the plaintiff, &c.

FORE KNIGHT, in the ſea-language, a piece of wood carved in the figure of a man's head, and faſt bolted to the beams upon the ſecond deck.

FORELAND, in the ſea-language, the ſame with a cape. See the article CAPE.

FORELAND, in fortification, a ſmall piece of ground between the wall of a place and the moat, called alſo *berme*, and *liziere*.

FORELOCKS, in the ſea-language, little flat wedges made with iron, uſed at the ends of bolts, to keep them from flying out of their holes.

FORELOIN, among huntſmen, is when a hound, going before the reſt of the cry, meets chace, and goes away with it.

FORELORN-HOPE, in the military art ſignifies men detached from ſeveral regiments, or otherwiſe appointed, to make the firſt attack in day of battle, or, at a ſiege, to ſtorm the counterſcarpe, mount the breach, or the like.

They are ſo called from the great danger they are unavoidably expoſed to; but the word is old, and begins to be obſolete.

FOREMAST *of a ſhip*, a large, round piece of timber, placed in her fore-part, or fore-caſtle, and carrying the foreſail and fore-top-ſail yards. Its length is uſually $\frac{8}{9}$ of the main maſt. And the fore-top gallant-maſt is $\frac{1}{2}$ the length of the fore-top-maſt. See the article MAST.

FOREMAST-MEN are thoſe on board a ſhip that take in the top-ſails, fling the yards, furl the ſails, howſe, trice, and take their turn at the helm, &c.

FORE-RAKE, in the ſea-language. See the article RAKE.

FORE REACH, in the ſea language, a ſhip is ſaid to fore-reach upon another, when both ſailing together, one ſails better, or out-goeth the other.

FORESCHOKE, in our old authors, ſignifies the ſame with foreſaken, and is particularly uſed in one of our ſtatutes for lands or tenements ſeiſed by the lord for want of ſervices performed by his tenant, and quietly held by ſuch lord above a year and a day, without any due courſe of law taken by the tenant for recovery thereof; here he does in preſumption of law diſavow or forſake all the rights he has thereto, for which reaſon thoſe lands ſhall be called foreſchoke.

FORE-SKIN, in anatomy, the ſame with prepuce. See the article PREPUCE.

FOREST, *ſylva*, in general a great wood, or a large extent of ground covered with trees.

FOREST, in law, is defined, by Manwood, a certain territory of woody grounds, and fruitful paſtures, privileged for wild beaſts and fowls of foreſt, chace and warren, to reſt and abide under the protection of the king, for his princely delight, bounded with unremoveable marks, and meres, either known by matter of record or preſcription; repleniſhed with wild beaſts of venery, or chace, with great coverts of vert for the ſaid beaſts; for preſervation and continuance whereof, with the vert and veniſon, there are certain particular laws, privileges and officers.

Foreſts are of that antiquity in England, that, excepting the new foreſt in Hampſhire, erected by William the Conqueror, and Hampton-Court, erected by Henry VIII. it is ſaid, that there is no record or hiſtory which makes any certain mention of their erection, though they are mentioned by ſeveral writers, and in divers of our laws and ſtatutes.

There are ſixty-nine foreſts in England, thirteen chaces, and 800 parks. The four principal foreſts are New-Foreſt, Sherwood-Foreſt, Dean-Foreſt, and Windſor-Foreſt.

The manner of erecting a foreſt is thus, *viz.* Certain commiſſioners are appointed under the great ſeal, who view the ground intended for a foreſt, and fence it round: this commiſſion being returned into chancery, the king cauſeth it to be proclaimed throughout the county where the land lieth, that it is a foreſt, and prohibits all perſons from hunting there, without his leave. Tho' the king may erect a foreſt on his own ground and waſte,

waſte, he may not do it on the ground of other perſons without their conſent; and agreements with them for that purpoſe, ought to be confirmed by parliament.

A foreſt, ſtrictly taken, cannot be in the hands of any but the king, for no perſon but the king has power to grant a commiſſion to be juſtice in eyre of the foreſt; yet, if he grants a foreſt to a ſubject, and that on requeſt made in the Chancery, that ſubject and his heirs ſhall have juſtices of the foreſt, in which caſe the ſubject has a foreſt in law.

A ſecond property of a foreſt is the courts thereof, as the juſtice ſeat, the ſwainmote, and the court of attachment. See the article ATTACHMENT, *&c.*

A third property is the officers belonging to it, as the juſtices, warden, verderer, foreſter, agiſtor, regarder, keeper, bailiff, beadle, *&c.* See the articles AGISTOR, BAILIFF, FORESTER, *&c.*

By the laws of the foreſt, the receivers of treſpaſſers in hunting, or killing of the deer, if they know them to be the king's property, are principal treſpaſſers. Likewiſe, if a treſpaſs be committed in a foreſt, and the treſpaſſer dies, after his death, it may be puniſhed in the life-time of the heir, contrary to common law. Our Norman kings puniſhed ſuch as killed deer in any of their foreſts with great ſeverity; alſo in various manners; as by hanging, loſs of limbs, gelding, and putting out eyes. By *magna charta de foreſta*, it is ordained, that no perſon ſhall loſe life or member for killing the king's deer in foreſts, but ſhall be fined; and if the offender has nothing to pay the fine, he ſhall be impriſoned a year and a day, and then be delivered, if he can give ſecurity, not to offend for the future, *&c.* 9 Hen. III. c. 1.

Before this ſtatute, it was felony to hunt the king's deer; and by a late act, perſons armed and diſguiſed, appearing in any foreſt, *&c.* if they hunt, kill, or ſteal any deer, *&c.* are guilty of felony. 9 Geo. I. c. 22.

He who has any licence to hunt in a foreſt or chace, *&c.* is to take care that he do not exceed his authority: otherwiſe he ſhall be deemed a treſpaſſer from the beginning, and be puniſhed for that fact, as if he had no licence.

FOREST-TREES. Many are averſe to pruning of foreſt-trees; but tho' it is to be done with care, yet it is by no means to be wholly omitted. It is obſervable in moſt foreſts, that, where one tree thrives well, there are twenty that grow faulty, all owing to their want of pruning, or lopping in a proper manner: for this, when wiſely executed, is not only a renewal of their age, but of their growth too; the want of it being the occaſion of trees running out with ſuckers, and over-loading themſelves with waſteful boughs, which draw all the ſap from the upper part of the tree, and make it knotty, moſſy, and unthrifty.

If a tree grows crooked, at the crooked place cut it off, ſloping upwards, and nurſe up one of the principal ſhoots to be a leading ſhoot, except it is of ſuch a ſort as is ſubject to die when headed; crooked trees may be made ſtraight by ſhredding up the ſide-branches, till you come above the crook where they are young. If any boughs are cropt by goats, or other cattle, cut them off cloſe to the body, for cattle leave a drivel where they bite, which not only infects the branches, but ſometimes endangers the whole tree. See the articles LOPPING, PRUNING, and TREE.

Aſſiſe of a FOREST. See ASSISE.

Charter of a FOREST. See the article CHARTER.

Drift of the FOREST. See DRIFT.

Foot of the FOREST. See the article FOOT.

Keeper of the FOREST. See KEEPER.

Preambulation of the FOREST. See the article PREAMBULATION.

Repoſition of the FOREST. See the article REPOSITION.

Waſte of the FOREST. See WASTE.

FOREST-TOWNS, in geography, certain towns of Swabia, in Germany, lying along the Rhine, and the confines of Switzerland, and ſubject to the houſe of Auſtria. Their names are Rhinefield, Seckingen, Laufenburg, and Waldſhut.

FORE-STAFF, or CROSS-STAFF, an inſtrument uſed at ſea for taking the altitude of the ſun, moon, or ſtars. It is called fore-ſtaff, becauſe the obſerver, in uſing it, turns his face towards the object; whereas in uſing Davis's quadrant, the back of the obſerver is towards the object; and hence its denomination of back-ſtaff. See the article BACK-STAFF.

The fore ſtaff is a ſquare graduated ſtaff A B, (plate CII. fig. 1. n° 1.) about three feet long, and half an inch thick. Each ſide is graduated like a line of tangents, and has a peculiar croſs piece or vane, which ſlides thereon. The firſt croſs piece, F F, belongs to that ſide where the diviſions begin at 3°, and end with 10°;

10°; and hence called the ten-crofs; The fecond, E E, is called the thirty-crofs, as belonging to that fide where the degrees begin at 10° and end at 30°. The third, D D, is called the fixty-crofs, as belonging to that fide of the inftrument where the divifions begin at 20° and end at 60°. The fourth crofs-piece, C C, is called the ninety-crofs, as belonging to that fide where the divifions begin at 30° and end at 90°.

For the manner of graduating the ftaff A B like a line of tangents. See the article TANGENT.

To obferve the fun's altitude by this inftrument. Firft confider, as near as you can guefs, whether the altitude be under 10°; in which cafe, the fhorteft or ten-crofs is to be ufed. If the altitude be gueffed to be above 10°, but under 30°, the thirty-crofs is to be ufed; if under 60°, the fixty-crofs; and if above 60°, the ninety-crofs. Having fitted on the proper crofs, place the flat end of the ftaff A (*ibid.* n° 2.) to the outfide of the eye, and look for the object at the upper end of the crofs D; and for the horizon, at the lower end C; moving the crofs backward and forward on the ftaff, till you fee the center of the fun, or other object, by the upper end D, and the horizon by the lower end C. Then the degrees and minutes cut by the inner edge of the crofs, on the proper fide of the ftaff for that crofs, make the altitude of the fun or ftar at the time of obfervation. In order to enable the eye to bear the fplendor of the fun, a coloured glafs is ufed at the top of the crofs. If the meridian altitude be required, continue your obfervation as long as the altitude of the object increafes, ftill moving the crofs nearer to the eye.

By fitting a horizontal vane on the eye-end of the ftaff A, (*ibid.* n° 2.) and a fight-vane on the lower end of the proper crofs at C, the fun's altitude may be found with the obferver's back turned towards the luminary: for looking through the fight-vane at C, let the crofs-piece be moved up or down, till the fhadow made by its upper end fall on the flit in the horizontal vane; the horizon being feen at the fame time through the vanes at C and A; then will the degrees cut on the proper fide of the ftaff, be the fun's altitude required.

FORESTAGE, in our old law-writers, a duty faid to have been formerly paid by forefters to the king. See FORESTER.

FORESTALLER, a perfon who is guilty of foreftalling. See the next article.

FORESTALLING, in law, buying or bargaining for any corn, cattle, victuals, or merchandize in the way as they come to fairs or markets to be fold, before they get thither, with an intent to fell the fame again at a higher price.

The punifhment for this offence, upon conviction at the quarter feffions, by two or more witneffes, is, for the firft time, two months imprifonment and the lofs of the goods, or the value; for the fecond offence, the offender fhall be imprifoned fix months, and lofe double the value of the goods; for the third offence, he fhall fuffer imprifonment during the king's pleafure, forfeit all his goods and chattels, and ftand on the pillory: but the ftatute does not extend to maltfters buying barley, or to badgers licenfed.

FORESTER, a fworn officer of the foreft, appointed by the king's letters patent, to walk the foreft at all hours, watch over the vert and venifon; alfo to make attachments and true prefentments of all trefpaffes committed within the foreft. See the article FOREST.

If a man comes into a foreft in the night, a forefter cannot lawfully beat him before he makes fome refiftance; but in cafe fuch a perfon refifts the forefter, he may juftify a battery. And a forefter fhall not be queftioned for killing a trefpaffer that, after the peace cried to him, will not furrender himfelf, if it be not done on any former malice; though, where trefpaffers in a foreft, *&c.* do kill a perfon that oppofes them, it is murder in all, becaufe they were engaged in an unlawful act, and therefore malice is implied to the perfon killed.

FORE-TOP-MAST, and FORE-TOP-GALLANT-MAST. See FORE MAST.

FORFAR, the capital of the county of Angus, in Scotland: weft long. 2° 32′, and north lat. 56° 25′.

It is a parliament-town, claffed with Perth, Dundee, Cowper, and St. Andrews, which altogether fend one member.

FORFEITURE, properly fignifies the effect of tranfgreffing fome penal law, and extends to lands or goods.

Forfeiture differs from confifcation, in that the former is more general, whilft confifcation is particularly applied to fuch things as become forfeited to the king's exchequer; and goods confifcated, are faid to be fuch as no body claims.

Full FORFEITURE, *plena foriſfactura*, called alſo *plena vita*, is the forfeiture of life and member, and all that a perſon has: this obtains in criminal caſes, as where a perſon is attainted of treaſon, felony, *&c.* There is alſo a forfeiture in civil caſes, as where a perſon hath an eſtate for life or years, he may forfeit it by alienation and claiming, or granting a larger eſtate than is veſted in him. All the lands or tenements of an offender, whether held in fee or tail, are forfeited on his committing high treaſon; and the king ſhall be deemed in poſſeſſion thereof without any office found, ſaving the rights of others. For petit treaſon, murder, robbery, burglary, and all felonies puniſhed with death, the offenders forfeit their lands in fee, goods and chattels. In manſlaughter, goods and chattels are forfeited; ſo in chance-medly, and ſe defendendo, though here an offender has his pardon of courſe. In the caſe of petit larceny, goods are alſo forfeited. See the article TREASON, *&c.*

FORFEITURE *of marriage*, a writ which formerly lay againſt a perſon that held lands by knights ſervice, who, being under age and unmarried, refuſed her whom the lord offered him, without diſparagement, and married another.

FORFEX, among ſurgeons, the ſame with forceps. See the article FORCEPS.

Some alſo call an inſtrument for drawing teeth by the name of forfex.

FORFICULA, the EAR-WIG, in zoology, a troubleſome inſect, which takes its engliſh name from its introducing itſelf into peoples ears, where it cauſes a great deal of pain; and its latin name, *forficula*, from its forked tail, which is a ſort of forceps, capable of pinching. The exterior wings are very ſhort or dimidiated, and wholly cover the inner ones. The antennæ are long and ſlender, conſiſting of thirteen or fourteen articulations.

According to Lemery, the dried powder of theſe inſects, is good in caſes of deafneſs; and the oil drawn from them, in convulſive caſes.

FORFICULA MARINA, the SEA-EAR-WIG, an inſect found about the ſea-ſhores, and ſo called from its reſemblance to the common ear-wig.

FOREFIELD, among miners, the fartheſt place of a meer of ground.

FORGE, properly ſignifies a little furnace, wherein ſmiths and other artificers of iron or ſteel, *&c.* heat their metals red hot, in order to ſoften and render them more malleable and manageable on the anvil. See the article FURNACE.

The forge uſed by the ſeveral operators in iron, is very ſimple: we ſhall inſtance in that of the black-ſmiths, to which all the reſt are reducible, the conſtruction of which is as follows. The hearth or fire-place of the forge, marked A. (See plate of ſmithery, fig. 1.) is to be built up from your floor with brick, about two feet and an half, or ſometimes more, according to the purpoſe you deſign to forge for: if your forge be intended for heavy work, your hearth muſt lie lower than it need be for light work: the forge may be of what breadth is thought convenient. It may be built with hollow arches underneath, to ſet ſeveral things out of the way: the back of it is built upright to the top of the ceiling, and incloſed over the fire-place with a hovel, which ends in a chimney, to carry away the ſmoke, as at B. In the back of the forge, againſt the fire-place, is fixed a thick iron-plate, and a taper pipe in it, about five inches long, which pipe comes through the back of the forge at C. Into this taper pipe is placed the noſe or pipe of the bellows: the office of this tewel is to preſerve the pipe of the bellows and the back of the forge about the fire-place, from burning. Right before the back is placed, at about two feet diſtance, the trough, which reaches commonly the whole breadth of the forge, and is as broad as is thought neceſſary, as at D. The bellows is placed behind the back of the forge, having one of its boards ſo fixed, that it can neither move upwards nor downwards. At the ear of the upper board is faſtened a rope or chain at E, which reaches up to the rocker, and is faſtened there to the further end of the handle, at F. This handle is faſtened acroſs a rock-ſtaff, which moves between two cheeks upon the center pins in two ſockets, at G; ſo that by drawing down this handle, the moving board of the bellows riſes; and by a conſiderable weight ſet on the top of its upper board, ſinks down again, and by this agitation performs the office of a pair of bellows. See the article BELLOWS and SMITHERY.

FORGE is alſo uſed for a large furnace, wherein iron-ore, taken out of the mine, is melted down; or it is more properly applied to another kind of furnace, wherein the iron-ore, melted down and ſeparated in a former furnace, and then caſt into

into ſows and pigs, is heated and fuſed over again, and beaten afterwards with large hammers, and thus rendered more ſoft, pure, ductile, and fit for uſe.

Of theſe there are two kinds: the firſt is called the finery, where the pigs are worked into groſs iron, and prepared for the ſecond, which is called the chafery, where it is further wrought into bars fit for uſe. See the articles FORGING, FINERY, and CHAFERY.

FORGER, in law, one guilty of forgery. See the next article.

FORGERY, in a legal ſenſe, is where a perſon fraudulently makes and publiſhes falſe writings to another's prejudice: or, it ſignifies the writ that lies againſt him who offends that way.

Forgery is either at common law, or by ſtatute; and is an offence puniſhable by indictment, information, &c. and not only where a perſon makes a falſe deed, but where any fraudulent alteration is made of a true one, in a material point thereof. Likewiſe a writing may be ſaid to be forged, where one being directed to draw up a will for another, does inſert ſome legacies therein falſely of his own head; though, in ſuch caſes, there is no forgery of the hand or ſeal of the party: but a perſon cannot regularly be guilty of this crime by an act of omiſſion, unleſs it alters the limitation of an eſtate to another, in which caſe it may be forgery. By a ſtatute of George II. c. 25. the forging or counterfeiting any deed, will, bond, bill, note, &c. with intent to defraud any perſon, or publiſhing ſuch falſe deed, bond, &c. knowingly, is declared to be felony; and the offender ſhall ſuffer death. The king may pardon the corporal puniſhment of forgery which tends to public example, tho' the plaintiff cannot releaſe it: yet in an extraordinary caſe, a forgery has been compounded, and the defendant diſcharged on paying a ſmall fine.

FORGING, in ſmithery, the beating or hammering iron on the anvil, after having firſt made it red hot in the forge, in order to extend it into various forms, and faſhion it into works. See the article FORGE.

There are two ways of forging and hammering iron; one is by the force of the hand, in which there are uſually ſeveral perſons employed, one of them turning the iron and hammering likewiſe, and the reſt only hammering. The other way is by the force of a water-mill, which raiſes and works ſeveral huge hammers beyond the force of man; under the ſtrokes whereof the workmen preſent large lumps or pieces of iron, which are ſuſtained at one end by the anvils, and at the other by iron-chains faſtened to the ceiling of the forge. See MILL.

This laſt way of forging is only uſed in the largeſt works, as anchors for ſhips, &c. which uſually weigh ſeveral thouſand pounds. For the lighter works, a ſingle man ſerves to hold, heat, and turn with one hand, while he hammers with the other.

Each purpoſe the work is deſigned for, requires its proper heat; for if it be too cold, it will not feel the weight of the hammer, as the ſmiths call it, when it will not batter under the hammer; and if it be too hot, it will red-ſear, that is, break or crack under the hammer.

The ſeveral degrees of heats the ſmiths give their irons, are, firſt, a blood-red heat; ſecondly, a white flame-heat; and, thirdly, a ſparkling or welding heat. See the article HEAT.

FORISFAMILIARI, in law, is where a ſon accepts of his father's part of lands, &c. in the lifetime of the father, and reſts contented with it, ſo that he cannot claim any more; upon which account he is termed foriſfamiliari.

FORKED HEADS, among ſportſmen, thoſe deers-heads which have their croches doubled.

FORK-TAIL, a name given in ſome parts of the kingdom to the ſalmon, in the fourth year of its growth.

FORLI, a town of Romania, in the pope's territories, fifteen miles ſouth-weſt of Ravenna.

FORLORN, or FORELORN. See the article FORELORN.

FORM, *forma*, in phyſics, the eſſential or diſtinguiſhing modification of the matter whereof a natural body is compoſed, ſo as thereby to give it ſuch a particular manner of exiſtence; being that which conſtitutes it ſuch a particular body, and diſtinguiſhes it from every other body.

The origin of forms, though eſteemed the nobleſt, hath yet been found one of the moſt perplexed inquiries in philoſophy, eſpecially as managed by the ſchools. The ſum of the controverſy is whether the form of natural things be, in generation, educed out of the power of the matter; or whether theſe forms are true

ſubſtantial entities, diſtinct from the other ſubſtantial principle of natural bodies, that is matter.

The reaſons which move me to embrace the negative, ſays Mr. Boyle, are principally theſe. Firſt, I ſee no neceſſity for admitting any ſuch ſubſtantial forms in natural things; matter and its accidents being ſufficient to explain as much of the phænomena of nature as we are likely to underſtand. In the next place, I ſee no uſe of this puzzling doctrine of ſubſtantial forms in natural philoſophy; nor can I imagine how a particular phænomenon ſhould be explained by a principle whoſe nature is unknown: and, laſtly, I cannot conceive how forms could be generated, as the peripatetics would have it.

On the other hand, the ſchoolmen tell us, that the power of matter, with regard to forms, is partly eductive, as the agent can make the form out of it; and partly receptive, whereby it can receive the form ſo made: but ſince the ſchoolmen will not allow that the form of a generated body was actually pre-exiſtent in its matter, or any where elſe, it is hard to conceive how a ſubſtance can be educed out of another ſubſtance totally diſtinct in nature from it, without being before ſuch eduction actually exiſtent in it. And as for the receptive power of the matter that fits it to receive or lodge a form, when united with it, how can it intelligibly be made to appear to contribute to the production of a new ſubſtance of a quite different nature from that matter, though it harbours it, when produced.

In ſhort, the form of a natural body, as is illuſtrated and confirmed by Sir Iſaac Newton's doctrine of motion, (ſee Newton's Optic. p. 372, 373.) is but an eſſential modification, and, as it were, the ſtamp of its matter; or ſuch a convention of the magnitude, ſhape, motion or reſt, ſituation and contexture of the ſmall parts that compoſe it, as is neceſſary to conſtitute and denominate it a particular body; and all thoſe accidents being producible in matter by local motion, we may well ſay that the firſt and univerſal, though not immediate cauſe of forms, is no other than God, who put matter into motion, eſtabliſhed its laws among bodies, and alſo guided it, in ſeveral caſes, at the beginning of things; and that among ſecond cauſes, the grand efficient of forms is local motion, which by variouſly dividing, ſequeſtring, tranſpoſing, and connecting the parts of matter, produces in them thoſe accidents and qualities upon account whereof the portion of matter they diverſify belongs to a determinate ſpecies of natural bodies: yet this is not ſo to be underſtood as if motion were only an efficient cauſe in the generation of bodies, for it is alſo frequently one of the chief accidents, as in water, fire, &c. that concur to make up the form. See the articles MOTION and FIRE.

Some modern writers, as particularly Sennertus, teach us, that beſides the ſpecific form in plants and animals, there reſide, and eſpecially in ſome determinate parts of them, certain other forms proper to thoſe parts, but ſo ſubjected to the predominant form, as to deſerve the title of ſubordinate; being, during the reign of the ſpecific form, ſubſervient to it: though, when the ſpecific form comes to be aboliſhed, theſe ſubordinate forms may ſet up for themſelves, and in reference to thoſe parts of matter they belong to, exerciſe the functions of ſpecific forms; as in a dog or a horſe, beſides the ſenſative ſoul, which is the ſpecific form of the whole creature, the fleſh, blood, and bones have their diſtinct forms appertaining to them, though they are ruled and employed by the ſoul, but as the matter which ſhe animates and informs; and when by death the ſenſative ſoul or ſpecific form is depoſed or aboliſhed, the body is not preſently reſolved into its ſeveral elements, but thoſe ſubordinate forms ſtill preſerve the fleſh, as in the ſtate of the fleſh; and the bones, as in the ſtate of the bones; the one for a little, and the other for a much longer time. This doctrine is urged from the ſpecific virtues obſervable in gathered plants, as the purgative faculty of rhubarb, ſena, and other cathartic vegetables. But, ſays Mr. Boyle, it were not difficult to propoſe experiments, which would determine this matter otherwiſe, were it important enough to deſerve it. However, as this doctrine of ſubordinate forms affords ſuch countenance to that of ſubſtantial ones, that author has been at the pains to prove, that ſubordinate forms are explicable upon other principles. See Shaw's Boyle, vol. I. p. 224.

FORM *of ſyllogiſms*, or *ſyllogiſtic* FORM, among logicians, a juſt diſpoſition both of the terms, in reſpect of predicate and ſubject, and of the propoſitions, in reſpect of quantity

quantity and quality: by which is only meant a diſpoſition wherein the concluſion follows duly and legitimately from the two premiſes; there being no form, where there is no concluſion. See the article SYLLOGISM.

FORM, in theology, is ſaid to be one of the eſſential parts of the ſacraments; being that which gives them their ſacramental nature and efficacy, and conſiſting in certain words, which the prieſt pronounces in adminiſtring them.

FORM is alſo uſed, in a moral ſenſe, for the manner of being or doing a thing according to rules: thus we ſay, a form of government, a form of argument, *&c.*

FORM, in law, the rules eſtabliſhed and requiſite to be obſerved in legal proceedings.

FORM, in carpentry, is uſed to denote the long ſeats or benches in the choirs of churches or in ſchools, for the prieſts, prebends, religious, or ſcholars to ſit on. At ſchools, the word form is frequently applied to what is otherwiſe termed a claſs. See the article CLASS.

FORM alſo denotes the external appearance or ſurface of a body, or the diſpoſition of its parts, as to the length, breadth, and thickneſs. See the article FIGURE.

FORM is alſo uſed, among mechanics, for a ſort of mould, whereon any thing is faſhioned or wrought: as the hatters form, the paper-makers form, *&c.*

Printer's FORM, an aſſemblage of letters, words and lines, ranged in order, and ſo diſpoſed into pages by the compoſitor; from which, by means of ink and a preſs, the printed ſheets are drawn.

Every form is incloſed in an iron-chaſe, wherein it is firmly locked by a number of pieces of wood; ſome long and narrow, and others of the form of wedges. There are two forms required for every ſheet, one for each ſide; and each form conſiſts of more or fewer pages, according to the ſize of the book.

FORM, in hunting, the ſeat of a hare; or the place and time, when and where ſhe ſquats.

FORM *of a ſeries*, in algebra, that affection of an undeterminate ſeries, which ariſes from the different values of the indices of the known quantity. See the article SERIES.

FORMA PAUPERIS, in law, is when a perſon has juſt cauſe of ſuit, but is ſo poor, that he cannot defray the uſual charges of ſuing at law or in equity; in which caſe, on making oath that he is not worth 5 l. in the world, on all his debts being paid, and producing a certificate from ſome lawyer that he has good cauſe of ſuit, the judge will admit him to ſue in forma pauperis; that is, without paying any fee to counſellors, attornies, or clerk: the ſtatute 11 Hen. VII. c. 12. having enacted, that council and attornies, *&c.* ſhall be aſſigned ſuch poor perſons gratis. Where it appears that any pauper has ſold or contracted for the benefit of his ſuit, whilſt it is depending in court, ſuch cauſe ſhall be thenceforth totally diſmiſſed; and a perſon ſuing in forma pauperis, ſhall not have a new trial granted him, but is to acquieſce in the judgment of the court.

FORMAL, ſomething belonging to, or conſtituting the form of a thing. See the article FORM.

FORMAL CAUSE. See the article CAUSE.

FORMALLY, *formaliter*, a term of various import in the ſchools. 1. Sometimes it denotes a ſubject, in which the predicate is contained merely on account of its form: thus white implies whiteneſs. 2. In a ſynonymous ſenſe with adequately. 3. For really, *&c.* See the article FORM.

FORMALITY, in the ſchools, that quality which conſtitutes the form of a thing. See the article FORM.

FORMALITY, in matters of law and polity, certain rules of judiciary proceedings, negociations, and contracts, which cuſtom or law hath made neceſſary, and therefore ought to be ſtrictly obſerved. See the article CEREMONY.

FORMATION, in philoſophy, an act whereby ſomething is formed or produced. For the formation of the fœtus in the womb, ſee the article FOETUS and GENERATION.

FORMATION *of ſtones*. See the article LITHOGENESIA.

FORMATION *of metals and minerals*. See the articles METAL and MINERAL.

FORMATION, in grammar, ſignifies the manner of forming one word from another: thus accountantſhip is formed from accountant, and this laſt from account.

FORMATUM PUNCTUM. See the article PUNCTUM.

FORME', or CROSS FORMY, in heraldry, a croſs narrow in the center, and broad at the extremities, otherwiſe called patée. See the article PATE'E.

FORMED, or FIGURED STONES, among naturaliſts. See the article STONE.

FORMEDON, in law, a writ that lies for a perſon

person who has a right to lands or tenements, by virtue of any intail, arising from the statute of Westm. 2 Ch. II.

This writ is of three kinds, *viz.* a descender, remainder, and reverter. Formedon in descender, lies where a tenant in tail infeoffs a stranger, or is disseised and dies, the heir may bring this writ to recover the land. Formedon in remainder, lies where a man gives lands, *&c.* to a person in tail, and for default of issue of his body, the remainder to another in tail: here if the tenant in tail die without issue, and a stranger abates and enters into the land, he in remainder shall have this writ. Formedon in reverter, lies where lands are intailed on certain persons and their issue, with remainder over for want of issue, and on that remainder failing, then to revert to the donor and his heirs: in this case, if the tenant in tail dies without issue, and also he in remainder, the donor and his heirs, to whom the reversion returns, may have this writ for the recovery of the estate, tho' the same be aliened, *&c.*

FORMERS, in gunnery, round pieces of wood, fitted to the diameter of the bore of a gun, chiefly used for making cartridges.

On these formers, the paper, parchment, or cotton, which is to make the cartridge, are rolled before it be sewed.

FORMICA, the ANT, in zoology. See the article ANT.

FORMICA, in medicine, a callous sort of wart, more usually called myrmecia. See the article MYRMECIA.

FORMICA-LEO, the ANT-LION, or ANT-EATER, in zoology, an insect so called from its devouring great numbers of ants. It is the caterpillar or worm of a fly much resembling the libellæ, or dragon-flies.

The address of this insect in catching the ants, is admirable; it makes a hole of a conical or funnel-shape, in the loose sand; and is sure to catch all the ants that come within the verge of this hole, by throwing up sand on them, whereby they are forcibly carried into the power of the enemy at the bottom of the hole.

FORMICATION, a term used among builders for arching or vaulting.

FORMING *of a siege*, in the military art. See the article SIEGE.

FORMING, in grammar. See the article FORMATION.

FORMOSA, an island in the pacific ocean, between 119° and 122° of east longitude, and between 22° and 25° north latitude, about 100 miles east of Canton in China. It is subject to the Chinese.

FORMULA, or FORMULARY, a rule or model, or certain terms prescribed or decreed by authority, for the form and manner of an act, instrument, proceeding, or the like.

FORMULA, in church history and theology, signifies a profession of faith. See the article FORM.

FORMULA, in medicine, imports the constitution of medicines, either simple or compound, both with respect to their prescription and consistence. Paracelsus calls red and clear urine, formula urinæ.

FORMULARY, a writing containing the form of an oath, declaration, attestation, abjuration, *&c.* to be made on certain occasions.

FORNACALIA, or FORNICALIA, in roman antiquity, a festival instituted by Numa in honour of Fornax, the goddess of ovens; wherein certain cakes were made, and offered in sacrifice before the ovens.

FORNAGE, *fornagium*, in our old writers, signifies the fee taken by a lord from his tenants, bound to bake in the lord's oven, or for a permission to use their own: this was usual in the northern parts of England.

FORNICATION, the act of incontinency between single persons; for when either of the parties is married, such act is adultery. See the article ADULTERY.

The spiritual court now has the sole cognizance of this offence which antiently was cognizable in other courts, as the court-leet, *&c.* in which the king had a fine affected on the offenders.

FORNICATION is sometimes also used as a generical term, including all kinds of offences against chastity.

FORNIX, in anatomy, a part of the brain placed under the septum lucidum, and, like it, composed of a medullary substance. Its anterior part rises with a double base, but the two parts soon unite: the hinder part is likewise bifid, and thence called crura fornicis, and by some, pedes hippocampi. See the article BRAIN.

FORPRISE, in law, signifies an exception or reservation, and is frequently used in leases and conveyances, wherein any exception is inserted; as such a thing excepted and forprised.

FORRAGE, in the military art, denotes hay,

hay, oats, barley, wheat, grafs, clover, *&c.* brought into the camp by the troopers, for the fuftenance of their horfes.

Dry forrage is the hay, oats, *&c.* delivered out of the magazines, to an army in garrifon, or when they take the field, before the green forrage is fufficiently grown up to fupply the troops.

It is the bufinefs of the quarter-mafter-general to appoint the method of forrage, and poft proper guards for the fecurity of the forragers. He ought alfo, in encamping an army, to take care that it be in a country abounding with forrage.

Ration of FORRAGE. See RATION.

FORRES, a parliament-town of Scotland, in the county of Murray, about thirteen miles weft of Elgin: weft long. 3° 20′, and north lat. 57° 40′.

It is claffed with Invernefs, Fortrofe, and Nairn. See the article BOROUGH.

FORSES, a name ufed in fome parts of the kingdom for a cataract, or water-fall. See the article CATARACT.

FORSTALLING, in law. See the article FORESTALLING.

FORT, in the military art, a fmall fortified place, environed on all fides with a moat, rampart, and parapet. Its ufe is to fecure fome high ground or the paffage of a river, to make good an advantageous poft, to defend the lines and quarters of a fiege, *&c.*

Forts are made of different figures and extents, according as the ground requires. Some are fortified with baftions, others with demi-baftions. Some again are in form of a fquare, others of a pentagon. A fort differs from a citadel, as this laft is built to command fome town. See the article CITADEL.

Royal FORT, one whofe line of defence is at leaft twenty-fix fathoms long.

To fortify a fquare fort, having infcribed the fquare in a circle, 1. Divide each of its fides A B, B D, *&c.* (plate CII. fig. 2. n° 1.) into two equal parts, in the point F. 2. From the center E, draw an indefinite line EF. 3. From the center draw alfo the lines E A, E B, E D, E C, to the angles of the fquare. 4. Divide the fide A B into eight equal parts. 5. Let one of thefe parts be laid off from F to G, and from G draw the lines of defence A G, B G. 6. Divide another fide of the fquare into feven equal parts. 7. Lay off two of thefe parts from A to K, and from B to L, which will be the faces of the baftions. 8. Take the diftance K L in your compaffes, and lay it off the lines of defence from K to H, and from L to I; and drawing H I, it will be the curtin; and the lines K I, L H, will be the flanks. See another method of fortifying a fquare, *ibid.* n° 3. Alfo two different methods of fortifying a triangle, *ibid.* n° 4 and 5.

Star FORT, a redoubt formed by a number of re-entering and falient angles, the fides of which flank each other. See plate CII. fig. 2. n° 2.

To defcribe a ftar-fort, 1. Draw an hexagon *a* B C *def.* 2. Divide one of its fides B C into four equal parts. 3. Upon the middle of this fide, raife the perpendicular D A, equal to ¼ of the fide B C, from D to A. 4. From the point A, draw the faces A C, A B. Let the fame operations be performed with refpect to the other fides of the hexagon, and you will have the ftar-fort required.

FORTAMENTE, in mufic, the fame with forte. See the article FORTE.

FORTAVENTURA, one of the Canary-iflands, fubject to Spain: weft long. 14°, and north lat. 27°.

FORTE, or FORTAMENTE, in mufic, directs to play ftrong and loud; and forte forte, or piu forte, fignifies a degree louder and ftronger than forte alone.

FORTIFICATION, the art of fortifying a town, or other place; or of putting them in fuch a pofture of defence, that every one of its parts defends, and is defended by fome other parts, by means of ramparts, parapets, moats, and other bulwarks; to the end, that a fmall number of men within, may be able to defend themfelves for a confiderable time againft the affaults of a numerous army without; fo that the enemy, in attacking them, muft of neceffity fuffer great lofs.

Fortification is either ancient or modern, regular or irregular. Antient fortification, at firft, confifted of walls or defences made of trunks, and other branches of trees, mixed with earth, to fecure them againft the attacks of the enemy. This was afterwards altered to ftone-walls, on which were raifed breaft-works, behind which they made ufe of their darts and arrows in fecurity. Modern fortification, is that which is flanked and defended by baftions and out-works, the ramparts of which are fo folid, that they cannot be beat down but by the continual fire of feveral batteries of cannon. Regular fortification, is that built in a regular polygon, the fides and angles of which are all equal, being commonly about

about a muſket-ſhot from each other. Irregular fortification, on the contrary, is that where the ſides and angles are not uniform, equidiſtant, or equal; which is owing to the irregularity of the ground, valleys, rivers, hills, and the like. See Bastion, &c.

The principal maxims of fortification are theſe: 1. That every part of the works be ſeen and defended by other parts, ſo that the enemy can lodge no where without being expoſed to the fire of the place. 2. A fortreſs ſhould command all places round it; and therefore all the out-works ought to be lower than the body of the place. 3. The works fartheſt from the center, ought always to be open to thoſe more near. 4. No line of defence ſhould exceed a point blank muſket-ſhot, which is about an hundred and twenty or an hundred and twenty-five fathoms. 5. The more acute the angle at the center is, the ſtronger will be the place. 6. In great places, dry trenches are preferable to thoſe filled with water, becauſe ſallies, retreats, and ſuccours are frequently neceſſary; but, in ſmall fortreſſes, water-trenches that cannot be drained, are beſt, as ſtanding in need of no ſallies, &c.

Different authors recommend different methods of fortification; but the principal are thoſe of Pagan, Blondel, Vauban, and Scheiter.

Fortification, according to the method of count Pagan, ſuppoſes the ſide A B (plate CII. fig. 3.) of the external polygon, in larger fortifications, 100 perches; in the ſmaller, 80; and in thoſe of middle ſize, 90; with the correſponding faces, 30, 25, and $27\frac{1}{2}$; the perpendicular, C D, being in all of them 15. Here too the flanks G F, H E, are perpendicular to the lines of defence, A E and B F: theſe flanks are alſo covered with an orillion and threefold. L M N is the boundary of the moat, parallel to the faces A G, B H. The curtin is defended by a double ravelin, O Q P being the external one, and *a c b* the internal; the faces of the baſtions being likewiſe defended by counter-guards *g f*, *e d*. This method, though received with great applauſe, is not without its defects. It is not only very expenſive, but its threefold flanks are too cloſe, ſo as to be too much expoſed to bombs; the largeneſs of the orillons is prejudicial to the length of the flanks, and the outer rampart is too thick.

Mr. Blondel's method of fortification has a great affinity with that of count Pagan, only that the lines and angles are otherwiſe determined. Thus by ſubſtracting a right angle from that of the polygon, and adding 15 to a third part of the remainder, you find the quantity of the diminiſhed angle A B E. In the greater fortifications, the ſide A B (plate CIII. fig. 1.) of the outer polygon is 100 perches, in the leſſer only 85; and A B being divided into ten equal parts, ſeven of them give the lines of defence A F, B E. The faces of the baſtions A G, B H, are equal to half thoſe of the tenaille A D, B D. In theſe faces is a kind of flanking batteries Q R, to defend the faces of the ravelin *e c d*. The flanks H F, G E, are threefold, as in count Pagan's method; and in the middle of the moat is a deep trench *a d b*. The other out-works are as repreſented in plate CIII. fig. 1.

Fortification, according to Vauban's method, ſuppoſes the outer polygon to be 100 perches in larger places, 80 in ſmaller ones, and 90 in thoſe of a middle ſize. The faces are made $\frac{2}{7}$ of the ſame, the perpendicular $\frac{1}{8}$ in a ſquare, $\frac{1}{7}$ in a pentagon, and $\frac{1}{6}$ in other polygons. He alſo makes the complement of the face to the line of defence, equal to the diſtance of the epaule; uſes re-entering crooked flanks, and places a low tenaille before the curtin. See plate CIII. fig. 2. n° 1.

This method of fortification is much cried up by many, both as it increaſes the ſtrength without much expence, and agrees very well with the maxims above laid down. Its greateſt fault lies in this, that the faces lie altogether expoſed to the enemy.

Vauban's new method places large baſtions before ſmall ones; the curtin being covered with a low tenaille and a double ravelin, *ibid.* n° 2.

Fortification, according to Scheiter's method, ſuppoſes the external ſide, A B, (plate CIII. fig. 3.) in large fortifications, 100 perches; in leſſer ones, 80; and in thoſe of middle ſize, 90. The flanks N O, P Q, are perpendicular to the lines of defence A Q, B O; which in greater fortifications are 70, in leſſer 60, and in thoſe of middle ſize, 65 perches: theſe detach the baſtions from the curtin, and form a kind of inner receſs behind the curtin. The angle of the baſtion in a ſquare, is 64°; in a pentagon,

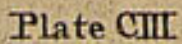


Fig. 1. FORTIFICATION, according to Mr BLONDEL.

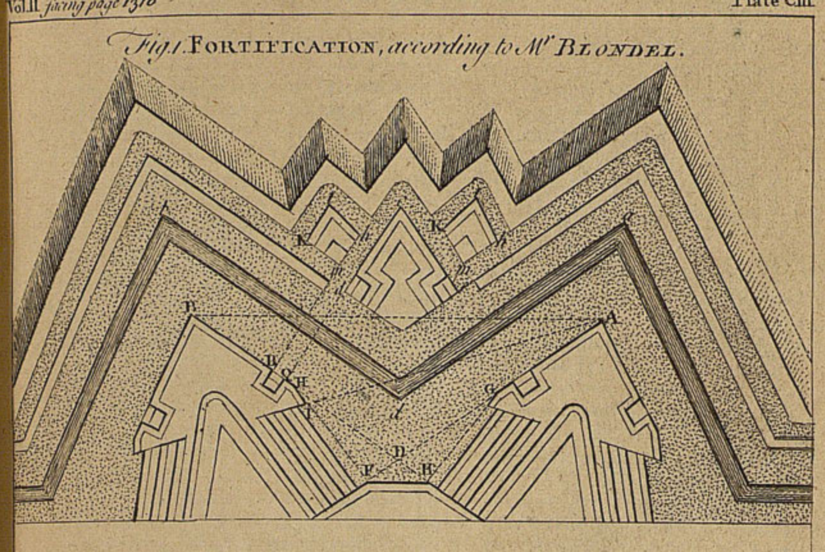


Fig. 2. Mr VAUBAN's Method of FORTIFICATION.

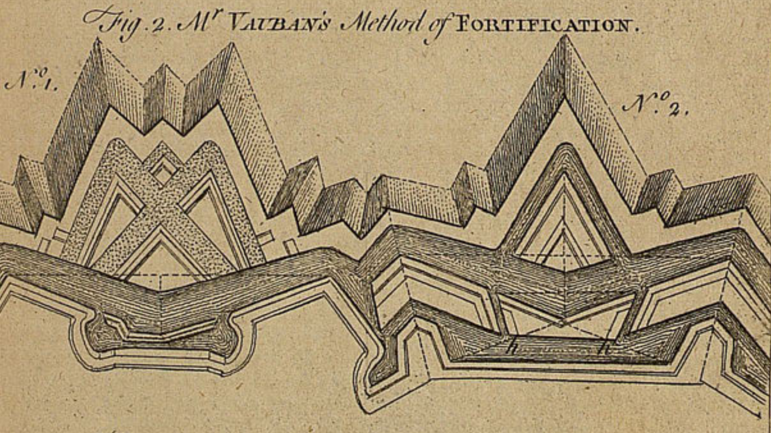
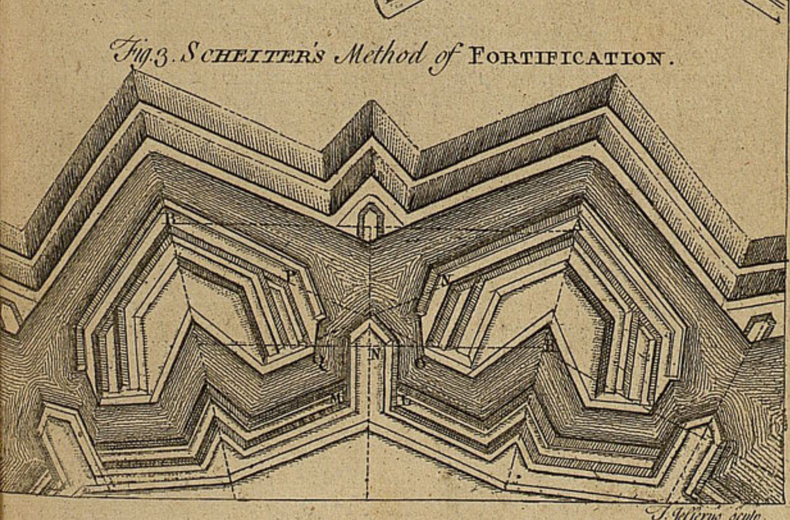


Fig. 3. SCHEITER's Method of FORTIFICATION.



T. Jefferys sculp.

gon, 72°; in a hexagon, 78°; in a heptagon, 83°; and in works of more ſides, this angle is found by adding 2° for every ſide above the heptagon.

As to the out-works, they are much the ſame as in the preceding methods, only that the covert-way is double; as is the ravel, which covers the curtin.

To lay down the plan of a regular fortification. 1. Meaſure exactly the circuit of the place to be fortified, at about twelve paces diſtance from the houſes; and dividing the whole circuit by 150 geometrical paces at leaſt, or 180 at moſt, the quotient will give the number of the baſtions, in ſuch a manner that their lines of defence ſhall not exceed the carriage of a muſquet ſhot. 2. Inſcribe in a circle a polygon with as many ſides as the place is to have baſtions; and from the center A (plate CIV. fig. 1.) through the angle B of the polygon, draw lines at pleaſure, which lines are called principals. Afterwards take B *a* = $\frac{1}{8}$ of the ſide of the polygon, and B F = $\frac{1}{5}$; then drawing the lines of defence F *g a*, F *g a*, from each point *a* raiſe perpendiculars; which meeting the lines of defence in the points *g*, *g*, will form the baſtions *a g* F *g a*, *a g* F, &c. 3. Having thus deſcribed the outward circuit of the rampart, draw lines *e*, *e*, *e*, parallel to the faces of the baſtions F*g*, F*g*, F*g*: theſe will determine the outward circuit of the moat, which ought to be rounded before the angles of the baſtions F, F. 4. To finiſh the plan, draw within the place lines parallel to thoſe which form the outward circuit of the rampart, at the diſtance of $\frac{1}{5}$ of the flank of the parapet; at the diſtance of $\frac{1}{2}$ the demigorge B *a*, for the rampart; and at the diſtance of five feet from the parapet, for the banquet. In the ſame manner, on the outſide of the moat, muſt be drawn lines parallel to its outward circuit, at the diſtance of $\frac{1}{4}$ of the flank for the covered way; and at the diſtance of $\frac{2}{3}$ of the flank for the glacis.

To lay down the profile of theſe works. Let A R R (plate CIV. fig. 2.) repreſent the level of the place; take A B, 5 paces, for the place of arms; the perpendicular O C, 16 feet, for the talus or ſlope; the thickneſs of the lower part of the rampart, B R, 12 paces; the upper part C D, 6$\frac{2}{3}$ paces; the banquet, *d* D, 6 feet; the thickneſs of the lower part of the parapet D V, 3$\frac{1}{3}$ paces; the upper, at E, 2$\frac{1}{3}$ paces; its inward height, E D, 6 feet; and its outward height, 5 feet; the talus of the rampart to the moat, G R, 7 feet; the talus of the ſcarp, *x y*, 2 paces; the depth of the moat, R *x*, 16 feet; the width of its channel, T, 15 feet; the talus of the counterſcarp, *a* K, 10 feet; and the banquet of the covered way, at L, 5 feet. Then follows the paliſade at N, and the glacis or eſplanade, M.

In plate CIV. fig. 3. is repreſented a hexagon fortified with all the kinds of out-works, together with the manner of carrying on the trenches of approach. Here is alſo delineated a pentagonal cittadel, with its out-works. The names of the different works and parts of this fortification, are theſe; *a*, *a*, *a*, &c. repreſent the declivity or ſlope, uſually called glacis; *b*, *b*, *b*, &c. the covert way; *c*, *c*, *c*, &c. the counterſcarp; *d*, a ſingle tenaille; *e*, a double tenaille; *f*, a horn-work; *g*, *g*, *g*, &c. places of arms; *h*, *h*, *h*, &c. the moat or ditch; *i*, *i*, *i*, &c. ravelins; *k*, *k*, *k*, &c. half moons; *l*, a crown-work; *m*, a bonnet or prieſt's cap; *n*, *n*, a counter-guard; *o*, *o*, *o*, &c. baſtions; *p*, *p*, *p*, baſtions with circular flanks; *q*, *q*, the curtin; *r*, *r*, *r*, &c. the ramparts; and *s*, *s*, *s*, &c. bridges over the moat. With reſpect to the approaches, 1, 1, 1, &c. repreſent the trenches; 2, 2, 2, &c. the lines of communication; 3, 3, 3, batteries; 4, 4, 4, &c. forts for the defence of the trenches; 5, the deſcent into the covered way; and 6, a mine.

Irregular FORTIFICATIONS are thoſe raiſed about irregular polygons; in which the engineer ought to follow, as much as poſſible, the proportions laid down for the regular ones. If baſtions are found too high to ſweep the circumjacent campaign, a ſecond baſtion muſt be added to the firſt, or even a third, if neceſſary; ſtill taking care that their faces may be well defended. If, on the contrary, a baſtion is too low, a cavalier muſt be raiſed on it. It will ſometimes alſo happen, that the faces of baſtions would become exceſſive long, if they were to be extended till they meet; in which caſe, they are uſually cloſed with a re-entering angle, *ibid.* fig. 4. When one ſide of the polygon is long enough to admit of a baſtion in its middle, it is remedied by raiſing one; but if it will not admit of this, it may be remedied by forming a ſalliant angle in the middle; or by advancing the neighbouring baſtions nearer to each other, ſo that

that both may be entirely formed upon that side. When a long extended side of a place cannot admit of bastions, as being cut off by a river, or stands upon a deep ascent, it may be fortified with redents or re-entering angles, not unlike the teeth of a saw. See plate CIV. fig. 5. But the defect of these redents is, that both the sides of the tenaille or front of a place, may be ruined from one battery; so that the besiegers may then make an assault without fear of being enfiladed.

Marine FORTIFICATIONS. Though these have nothing peculiar in them, yet it may not be improper to give some directions with relation to batteries. 1. In raising batteries to hinder a descent, care should be taken to dispose them in such places where the descent is most easy; and the guns should be so levelled, as to scour the surface of the water, that they may fire effectually upon the boats as they approach. 2. It is likewise convenient to have batteries to play upon places where there is good anchorage; and these should be somewhat more elevated than the former. 3. It is also necessary to erect batteries at the entrance of roads; and these ought to be so made, as to discover ships at a distance. 4. It is very necessary that these batteries should be defended, by some works, against attacks; and, if possible, should be under the fire of the place; or at least, they ought not to be too far advanced.

FORTIFIED, an appellation given to places defended by ramparts, bastions, ditches, covert-ways, half-moons, ravelins, tenailles, and other out-works. See the articles RAMPART, BASTION, &c. and the preceding article.

FORTIN, FORTLET, or *field*-FORT, a sconce or little fort, whose flanked angles are generally distant one from another 120 fathoms. See the article FORT.

The extent and figure of fortins are different, according to the situation or nature of the ground; some of them having whole bastions, and others demi-bastions. They are made use of only for a time, either to defend the lines of circumvallation, or to guard some passage or dangerous post.

FORTISSIMO, in music, sometimes denoted by F F F, or *f f f*, signifies to sing or play very loud or strong.

FORT-LEWIS, a fortress of Alsace, in Germany, situated on the western shore of the Rhine, subject to France: east long. 8°, and north lat. 48° 46′.

FORTUNA, in our antient law-books, is the same with what we call treasure-trove. See the article TREASURE.

FORTUNA EQUESTRIS, in roman antiquity, a statue of the goddess Fortune, mounted on horseback in the middle of the city.

FORTUNATE-ISLANDS, in antient geography, certain islands concerning the situation of which authors are not agreed, famous for the golden apples of the Hesperides. See the article HESPERIDES. The common opinion is, that they are the same with the Canary-islands. See the article CANARY.

FORTUNE, *fortuna*, a goddess worshiped with great devotion by the antient Greeks and Romans, who believed her to preside over human affairs, and to distribute wealth and honour at her pleasure.

The Greeks had a great number of temples dedicated to Fortune, under the name of τυχη. The poet Pindar makes her one of the parcæ, or destinies, and the daughter of Jupiter. Ancus Martius, king of the Romans, was the first who built a temple at Rome to this deity, under the name of *fortuna virilis*, on account that courage, no less than good fortune, is requisite to obtain a victory. Servius Tullus built a temple to fortune, under the name of primogenia. The Romans gave several other appellations to fortune, such as fortuna libera, redux, publica, &c. There was a statue of Fortune at Athens, holding betwixt her arms Plutus the god of riches. Pausanias says, that her most antient form was that which Bupalus made in Greece, in shape of a woman with a round ball on her head, and a cornucopia under her arm. Macrobius says, that she was first set forth with wings on her shoulders, having by her side the rudder of a ship; and that she was placed upon a wheel, and held in her right hand a golden ball, and in her left a whip. In Ægypt she was painted like a woman, turning a great glass wheel, on whose top were represented a great number of men playing, others climbing up, and others, having attained the summit of the wheel, precipitating themselves, and falling down again. Modern painters represent Fortune by a naked woman, standing on a globe, with a bandage on her eyes.

Horace's description of this goddess, and her great power, may be seen in ode xxxv. lib. 1. Juvenal, in Satire x. v. 365. calls Fortune the deity of fools.

FORTY-

FORTY-SHILLING LAND, a certain quantity of arable land; that of old extent, containing eight ox-gang, or an hundred and four acres.

FORUM, in roman antiquity, a public standing place within the city of Rome, where causes were judicially tried, and orations delivered to the people.

There were six of these forums, *viz.* the Romanum, Julianum, Augustum, Palladium, Trojanum, and Salustii forum. The first and most eminent of these was the forum Romanum, called absolutely the Forum. In this was an apartment called the rostra, where the lawyers pleaded, and the orators harangued the people, &c. Here was also the comitium, or hall of justice, with the sanctuary of Saturn, the temple of Castor, &c. All the compass of the forum was arched with porticos, some passages being only left for places of entrance.

FORUM was also used for a place of traffic, answering to our market place: of these there were vast numbers, as the *forum piscarium, olitorium*, &c. These were generally called *fora venalia*, in contradistinction to the former, which were called *fora civilia*.

FORUM is also used, among casuists, &c. for jurisdiction; thus they say, *In foro legis*, &c.

FOSS, or FOSSA, in anatomy, a kind of cavity in a bone, with a large aperture, but no exit or perforation.

FOSS is particularly used for the cavity, or indenture, in the back part of the neck.

FOSSA *magna*, the interior cavity, or rima magna, of the pudendum muliebre. Bartholin calls it fossa navicularis. This cavity appears, upon opening the labia; it has the carunculæ myrtiformis in the middle of it. See the article CARUNCULÆ MYRTIFORMES.

FOSS, in fortification, a hollow place, commonly full of water, lying between the scarp and counterscarp, below the rampart; and turning round a fortified place or a post, that is to be defended. See the article MOAT.

FOSSA, in our antient customs, was used to signify a ditch full of water, wherein women, convicted of felony, were drowned. See the article FURCA.

FOSS-WAY, one of the four principal highways of England, that antiently led through the kingdom; supposed to be made by the Romans, having a ditch upon one side thereof.

FOSSANO, a town of Piedmont, nineteen miles south-east of Turin.

FOSSARII, in antiquity, a sort of officers in the eastern church, whose business it was to inter the dead.

St. Jerom assures us, that the rank of the fossarii held the first place among the clerks; but he is to be understood of those clerks only who had the direction and intendance of the interment of the devout. Some authors insinuate, that the fossarii were instituted in the time of the apostles.

FOSSATORUM *operatio*, signifies the foss-work; or the service of labouring performed by inhabitants, and adjoining tenants, for the repair and maintenance of the ditches round a city or town. The contribution towards this work was termed *Fossagium*.

FOSSIGNY, a county in the dutchy of Savoy. See the article SAVOY.

FOSSIL, in natural history, denotes, in general, every thing dug out of the earth, whether they be natives thereof, as metals, stones, salts, earths, and other minerals; or extraneous, reposited in the bowels of the earth by some extraordinary means, as earthquakes, the deluge, &c. See the articles METAL, STONE, &c.

Native fossils, according to Dr. Hill, are substances found either buried in the earth, or lying on its surface, of a plain simple structure, and shewing no signs of containing vessels or circulating juices. These are subdivided, by the same author, 1. Into fossils naturally and essentially simple. Of these, some are neither inflammable, nor soluble in water, as simple earths, talcs, fibrariæ, gypsum, selenitæ, crystal, and spars; others, tho' uninflammable, are soluble in water, as all the simple salts; and others, on the contrary, are inflammable, but not soluble in water, as sulphur, auripigmentum, zarnich, amber, amber-greafe, gagates, asphaltum, ampelites, lithanthrax, napththa, and pissasphalta. 2. The second general subdivision of fossils comprehends all such as are naturally compound, but unmetallic. Of these, some are neither inflammable, nor soluble in water, as compound earths, stones, septariæ, siderochita, scrupi, semi-pellucid gems, lithidia, conissalæ, and pellucid gems; others are soluble in water, but not inflammable, as all the metallic salts; and, lastly, some are inflammable, but not soluble in water, as the marcasites, pyritæ, and phlogonia. 3. The third

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and laſt general diviſion of foſſils comprehends all the metallic ones; which are bodies naturally hard, remarkably heavy, and fuſible in fire. Of theſe, ſome are perfectly metallic, as being malleable when pure; ſuch are gold, lead, ſilver, copper, iron, and tin: others are imperfectly metallic, as not being malleable even in their pureſt ſtate, ſuch are antimony, biſmuth, cobalt, zinc, and quickſilver, or mercury. Of all which ſubſtances the reader will find a particular deſcription under their reſpective heads, EARTH, TALC, FIBRARIÆ, GYPSUM, &c.

Extraneous foſſils are bodies of the vegetable or animal kingdoms accidentally buried in the earth. Of the vegetable kingdom, there are principally three kinds, trees or parts of them, herbaceous plants, and corals; and of the animal kingdom there are four kinds, ſea-ſhells, the teeth or bony palates and bones of fiſhes, complete fiſhes, and the bones of land animals. See the articles TREE, WOOD, PLANT, SHELL, &c.

As to the reaſon why theſe extraneous foſſils come to be lodged in the bowels of the earth, the common opinion is, that this great change was effected by the univerſal deluge. See DELUGE.

FOSSOMBRONE, a city and biſhop's ſee of Italy, ten miles ſouth-eaſt of Urbino.

FOTHER, or FODDER, in mining. See the article FODDER.

FOVEA CORDIS, in anatomy, the pit of the heart, or rather of the ſtomach.

FOUGADE, or FOUGASSE, in the art of war, a little mine, about eight or ten feet wide, and ten or twelve deep, dug under ſome work or poſt, which is in danger of falling into the enemies hands; and charged with ſacks of powder, covered with ſtones, earth, and whatever elſe can make great deſtruction. It is ſet on fire like other mines, with a fauciſſe.

FOUGIERES, a town of Britany, in France, thirty-five miles ſouth eaſt of St. Malo.

FOUL, or FOULE, in the ſea-language, is uſed when a ſhip has been long untrimmed, ſo that the graſs-weeds, or barnacles grow to her ſides under water. A rope is alſo foul when it is either tangled in itſelf, or hindered by another, ſo that it cannot run, or be over-hawled.

FOUL imports, alſo, the running of one ſhip againſt another. This happens ſometimes by the violence of the wind, and ſometimes by the careleſſneſs of the people on board, to ſhips in the ſame convoy, and to ſhips in port by means of others coming in. The damages occaſioned by running foul, are of the nature of thoſe in which both parties muſt bear a part. They are uſually made half to fall upon the ſufferer, and half upon the veſſel which did the injury: but in caſes where it is evidently the fault of the maſter of the veſſel, he alone is to bear the damage.

FOUL WATER. A ſhip is ſaid to make foul water, when being under ſail, ſhe comes into ſuch ſhoal-water, that tho' her keel do not touch the ground, yet it comes ſo near it, that the motion of the water under her, raiſes the mud from the bottom.

FOULNESS, in ſurgery, a term applied to wounds, where the fleſh is putrid, fungous, black or livid. Wounds muſt be well cleanſed before any attempts are made to heal them. For which intention the antients uſed honey, but the moderns apply a digeſtive ointment made of turpentine diſſolved in the yolk of an egg, and afterwards mixed with honey of roſes; but where this is not found ſtrong enough for the purpoſe, they ſubſtitute the egyptian ointment, mixed either with ſpirit of wine, or with the common digeſtive. To theſe digeſtive ointments, a ſmall quantity of aloes or myrrh may be added, and where more ſtrength is required, a ſmall quantity of red precipitate. The uſe of lime-water as a detergent is alſo known to be very beneficial, eſpecially if there be added to every pint of it, twenty or thirty grains of ſublimate, which from its known efficacy is called by the ſurgeons phagedenic-water. Applications of this kind are to be continued till the wound is intirely clean, and then it is to be healed with the common digeſtives. See the article WOUND.

FOUMART, a name uſed in ſome parts of the kingdom for the muſtela, or weaſel. See the article MUSTELA.

FOUNDATION, in architecture, is that part of a building which is under ground. See the article BUILDING.

Foundation, called by Daviler, *Fondation*, is the coffer or bed dug below the level of the ground to raiſe a building upon, in which ſenſe the foundation either goes to the whole area of the building, as when there are to be vaults, cellars,

cellars, &c. or it is drawn in trenches, as when only walls are to be raiſed. The foundation, *Fondement*, according to the ſame author, is properly ſo much of the maſonry as reaches as high as the ſurface of the ground, and ought always to be proportioned to the load or weight of the building that it is to bear. Sometimes the foundation is maſſive, and continued under the whole building, as in the antique arches and aqueducts, and ſome amphitheatres; but it is more uſually in ſpaces or intervals, either to avoid expence, or becauſe the vacuities are at too great a diſtance, in which latter caſe they make uſe of inſulated pillars bound together by arches.

Palladio allows a ſixth part of the height of the whole building for the hollowing or under-digging, unleſs there be cellars under-ground, in which caſe he would have it ſomewhat lower, and as to thickneſs, double the width of a wall is no bad rule. Palladio alſo lays down ſeveral rules to know if the earth be firm enough for the foundation, by obſervations from the digging of wells, and the like; but the beſt way to diſcover the nature of the ſoil is to try it with an iron-crow, or elſe with a borer, ſuch as is uſed by well-diggers.

Foundations are either natural or artificial. Natural as when we build upon a rock, or very ſolid earth, in which caſe we need not ſeek for any further ſtrengthening; for theſe, without digging, or other artificial helps, are of themſelves fit to uphold the greateſt buildings. But if the ground be ſandy, or marſhy, or have lately been dug, recourſe muſt be had to art. If the ground be ſandy or marſhy, you muſt dig till you find ſound ground, and the beſt is that which requires moſt labour in cutting, and when wet, does not diſſolve into dirt. If the earth to be built upon is very ſoft, as in mooriſh grounds, lay good pieces of oak whoſe length muſt be about the breadth of the trench, or two feet longer than the breadth of the wall, acroſs the foundation, about two feet aſunder, and being well rammed down, lay long planks upon them, pinning or ſpiking down each plank to the pieces of oak on which it lies. But if the ground be very bad, let piles of oak of a diameter about one twelfth part of their length be drove down to reach the good ground, and placed as cloſe as one can ſtand by another; then ſpike down long planks upon them. And it muſt not be forgot to place the piles not only under the outer walls, but alſo under the inner walls that divide the building; for if theſe ſhould ſink, it would make the outer wall crack, and ſo ruin the whole building. If the ground be faulty here and there, let arches be turned over the faulty places, which will diſcharge them of the weight. As to the rules neceſſary to be obſerved in the ſubſtruction or artificial part of the foundation, they are theſe, 1. That the bottom of the trench be made exactly level. 2. That the loweſt ledge or row be all of ſtone (the broader the better) laid cloſe together. 3. That the breadth of the ground-work be at leaſt double that of the wall to be raiſed on it. However, the breadth may be regulated according to the goodneſs of the ground, and the weight of the intended edifice. 4. That the foundation be made to diminiſh as it riſes, taking care, however, that it do ſo equally on both ſides. 5. That you ought never to build on the ruins of an old foundation, unleſs well aſſured of its depth and ſtrength to bear the ſuperſtructure. 6. And laſtly, The ſtones in a foundation ſhould be laid as they naturally lie in the quarry, a precept generally obſerved by all good architects, becauſe they find the ſtones are ſubject to cleave that way of the grain that lay horizontally in the quarry. In ſome places, buildings near the water are founded on ſacks of wool laid like matraſſes, which being well preſſed and greaſy, will never give way, nor rot in the water.

Foundation of Bridges is laid after different manners. The firſt is by encloſing all round the ſpace of ground you would build upon, by dams made with piles ſet deep in the ground in double rows, well ſtrengthened and bound together with croſs pieces and cords, and filling the vacant ſpaces between them with chalk or other earthy matter. This being done, the water muſt be emptied out, and the foundation dug according to the quality of the ground, driving down piles, if it be neceſſary, upon which the walls of the foundation muſt be laid. But this method is only practicable in building on ſuch rivers, where the water is neither very rapid, nor very deep. The ſecond is done by laying the foundation on grate-work, rafts of ſtout oak well bound to-

together, and made faſt at the ſurface of the water with cables or machines, and building upon them large quarters of ſtone, cramped together, and joined with good mortar, or cement, and afterwards letting them deſcend ſoftly by theſe cables and machines perpendicularly to the bottom of the water. This was the method practiſed in laying the foundation of Weſtminſter-Bridge, the grating being made at the bottom of a frame called by the French *Caiſſon*, the ſides of which were ſo contrived, that they might be taken off, after a pier was finiſhed. The third is by drawing off all, or the greateſt part of the water of the river into ſome other place; and this was done at London-Bridge, if we could believe Stow, who alleges, that during the time of building, the river was turned from Batterſea to Rotherhith: but this is not warranted. See further on this ſubject in Belidor's Archit. Hydraulique, Livre iv. ch. 11, and 12.

FOUNDATION denotes alſo a donation or legacy either in money or lands, for the maintenance and ſupport of ſome community, hoſpital, ſchool, lecture, &c.

FOUNDATION is alſo uſed figuratively for the eſtabliſhment of a city, empire, or the like.

FOUNDAY, in metallurgy, a term uſed by the workers at the iron-mines in many counties of England, for the ſpace of ſix days, in which time they contrive to make a determinate quantity of iron; ſo that they count their work by theſe foundays, or weeks.

FOUNDER, in a general ſenſe, the perſon, who lays a foundation, or endows a church, ſchool, religious-houſe, or other charitable inſtitution. The founder of a church may preſerve to himſelf the right of patronage, or preſentation to the living.

FOUNDER, alſo implies, an artiſt who caſts metals, in various forms, for different uſes, as guns, bells, ſtatues, printing characters, candleſticks, buckles, &c. whence they are denominated gun-founders, bell founders, figure-founders, letter-founders, founders of ſmall works, &c. See the article FOUNDERY.

FOUNDER, in glaſs-making, a term appropriated to the green glaſs, and is the perſon there, who in the ſame office in the white-glaſs making is called conciator. See the article CONCIATOR.

FOUNDER, in the ſea-language. A ſhip is ſaid to founder, when by an extraordinary leak, or by a great ſea breaking in upon her, ſhe is ſo filled with water, that ſhe cannot be freed of it; ſo that ſhe can neither veer nor ſteer, but lie like a log; and not being able to ſwim along, will at laſt ſink.

FOUNDERING, in the manege, a diſorder in horſes, whereof there are two kinds, *viz.* in the feet and in the cheſt.

Foundering in the feet is an univerſal rheumatiſm, or defluxion of humours upon the ſinews of a horſe's feet, which cauſes ſo great a ſtiffneſs in the hoofs, that the horſe has no ſenſe nor feeling of them.

This diſorder ariſes from hard riding; from great heats and colds; and is ſometimes occaſioned by watering a horſe when he is very hot, by which means, as the farriers term it, his greaſe is melted within him; alſo by wearing too ſtrait a ſhoe, or travelling upon hard ground.

The general methods of curing this diſtemper are, firſt to pare all the horſe's ſoles ſo thin, that you may ſee the quick: then bleed him well at every toe; ſtop the vein with tallow and roſin; and having tacked hollow ſhoes on his feet, ſtop them with bran, tar, and tallow, as boiling hot as may be; and this renew once in two days for a week together, after which let him have good exerciſe, &c. or, after he is pared thin, and let blood at his toes, ſtop his feet with cow's dung, kitchen-fee, tar, and ſoot, boiled together, and poured boiling-hot into them.

Foundering in the cheſt may proceed from crudities in the ſtomach, or other infirmities, obſtructing the paſſages of the lungs; and may be diſcovered by the horſe's not being able to bow his joints; and being once laid, he cannot riſe again; his legs ſwell, &c.

As a particular remedy for cheſt-foundering, take five or ſix pennyworth of oil of peter, and mingle it with an equal quantity of ale, or beer: then rub this mixture with your hand on the part affected; and cauſe a red hot fire-ſhovel to be held before it during the application.

FOUNDERY, or FOUNDRY, the art of caſting all ſorts of metals into different forms. It likewiſe ſignifies the work-houſe, or ſmelting-hut, wherein theſe operations are performed.

FOUNDERY *of ſmall-works, or caſting in ſand.* The ſand uſed for caſting ſmall-works,

works, is, at firſt, of a pretty ſoft, yellowiſh, and clammy nature: but it being neceſſary to ſtrew charcoal duſt in the mould, it at length becomes of a quite black colour. This ſand is worked over and over, on a board, with a roller, and a ſort of knife; being placed over a trough to receive it, after it is by theſe means ſufficiently prepared.

This done, they take a wooden board of a length and breadth proportional to the things to be caſt, and putting a ledge round it, they fill it with ſand, a little moiſtened, to make it duly cohere. Then they take either wood or metal models of what they intend to caſt, and apply them ſo to the mould, and preſs them into the ſand, as to leave their impreſſion there. Along the middle of the mould is laid half a ſmall braſs-cylinder, as the chief canal for the metal to run through, when melted, into the models, or patterns; and from this chief canal are placed ſeveral others, which extend to each model or pattern placed in the frame. After this frame is finiſhed, they take out the patterns, by firſt looſening them all round, that the ſand may not give way.

Then they proceed to work the other half of the mould with the ſame patterns in juſt ſuch another frame, only that it has pins, which, entering into holes that correſpond to it in the other, make the two cavities of the pattern fall exactly on each other.

The frame thus moulded, is carried to the melter, who, after extending the chief canal of the counterpart, and adding the croſs canals to the ſeveral models in both, and ſtrewing mill duſt over them, dries them in a kind of oven for that purpoſe.

Both parts of the mould being dry, they are joined together by means of the pins; and to prevent their giving way, by reaſon of the melted metal paſſing through the chief cylindrical canal, they are ſcrewed or wedged up like a kind of a preſs.

While the moulds are thus preparing, the metal is fuſing in a crucible of a ſize proportionate to the quantity of metal intended to be caſt.

Some of theſe ſmall work founder's furnaces are like a ſmith's forge; others ſtand a few feet under-ground for the more eaſily and ſafely taking out a weighty pot of metal; which is done by means of a circular tongs that graſps round the top of the crucible. When the metal is melted, the workman pours it through the chief canal of each mould, which conveys it to every diſtinct pattern. See the articles FLUX and FORGE.

When the moulds are cooliſh, the frames are unſcrewed, or unwedged, and the caſt work taken out of the ſand, which ſand is worked over again for other caſtings.

FOUNDERY *of ſtatues.* The caſting of ſtatues depends on the due preparation of the pit, the core, the wax, the outer mould, the inferior furnace to melt off the wax, and the upper to fuſe the metal.

The pit is a hole dug in a dry place ſomething deeper than the intended figure, and made according to the prominence of certain parts thereof. The inſide of the pit is commonly lined with ſtone, or brick; or when the figure is very large, they ſometimes work on the ground, and raiſe a proper fence to reſiſt the impulſion of the melted metal.

The inner mould, or core, is a rude maſs to which is given the intended attitude and contours. It is raiſed on an iron-grate, ſtrong enough to ſuſtain it, and is ſtrengthened within by ſeveral bars of iron. It is generally made either of potter's clay, mixed with hair, and horſe-dung; or of plaſter of Paris mixed with brick-duſt. The uſe of the core is to ſupport the wax, the ſhell, and leſſen the weight of the metal. The iron-bars and the core are taken out of the braſs figure through an aperture left in it for that purpoſe, which is ſoldered up afterwards. It is neceſſary to leave ſome of the iron-bars of the core, that contribute to the ſteadineſs of the projecting part within the braſs figure.

The wax is a repreſentation of the intended ſtatue. If it be a piece of ſculpture, the wax ſhould be all of the ſculptor's own hand, who uſually forms it on the core; though it may be wrought ſeparately in cavities, moulded on a model, and afterwards arranged on the ribs of iron over the grate; filling the vacant ſpace in the middle with liquid plaſter and brick-duſt, whereby the inner core is proportioned as the ſculptor carries on the wax.

When the wax, which is the intended thickneſs of the metal is finiſhed, they fill ſmall waxen tubes perpendicular to it from top to bottom, to ſerve both as canals for the conveyance of the metal to all parts of the work; and as vent-holes,

holes, to give paffage to the air, which would otherwife occafion great diforder, when the hot metal came to encompafs it.

The work, being brought thus far, muft be covered with its fhell, which is a kind of cruft laid over the wax, and which being of a foft matter, eafily receives the impreffion of every part, which is afterwards communicated to the metal upon its taking the place of the wax, between the fhell and the mould. The matter of this outer mould is varied according as different layers are applied. The firft is generally a compofition of clay, and old white crucibles well ground and fifted, and mixed up with water, to the confiftence of a colour fit for painting: accordingly they apply it with a pencil, laying it feven or eight times over, and letting it dry between whiles. For the fecond impreffion, they add horfe-dung and natural earth to the former compofition. The third impreffion is only horfe-dung and earth. Laftly, the fhell is finifhed by laying on feveral more impreffions of this laft matter, made very thick with the hand.

The fhell, thus finifhed, is fecured by feveral iron-girts, bound round it, at about half a foot diftance from each other, and faftened at the bottom to the grate under the ftatue, and at top to a circle of iron where they all terminate.

If the ftatue be fo big that it would not be eafy to move the moulds with fafety, they muft be wrought on the fpot where it is to be caft. This is performed two ways: in the firft a fquare hole is dug under ground, much bigger than the mould to be made therein, and its infide lined with walls of free-ftone, or brick. At the bottom is made a hole of the fame materials with a kind of furnace, having its aperture outwards: in this is a fire made to dry the mould, and afterwards melt the wax. Over this furnace is placed the grate, and upon this the mould, *&c.* formed as above. Laftly, at one of the edges of the fquare pit, is made another large furnace to melt the metal. In the other way, it is fufficient to work the mould above ground, but with the like precaution of a furnace and grate underneath. When finifhed, four walls are to be run around it, and by the fide thereof, a maffive made for a melting furnace. For the reft, the method is the fame in both. The mould being finifhed, and inclofed as defcribed, whether under ground or above it, a moderate fire is lighted in the furnace under it, and the whole covered with planks, that the wax may melt gently down, and run out at pipes contrived for that purpofe, at the foot of the mould, which are afterwards exactly clofed with earth, fo foon as the wax is carried off. This done, the hole is filled up with bricks thrown in it at random, and the fire in the furnace augmented, till fuch time as both the bricks and mould become red hot. After this, the fire being extinguifhed, and every thing cold again, they take out the bricks and fill up their place with earth, moiftened, and a little beaten to the top of the mould, in order to make it the more firm and fteady. Thefe preparatory meafures being duly taken, there remains nothing but to melt the metal, and run it into the mould. This is the office of the furnace above defcribed, which is commonly made in the form of an oven with three apertures, one to put in the wood, another for a vent, and a third to run the metal out at. From this laft aperture, which is kept very clofe, while the metal is in fufion, a fmall tube is laid, whereby the melted metal is conveyed into a large earthen bafon, over the mould, into the bottom of which all the big branches of the jets, or cafts, which are to convey the metal into all the parts of the mould, are inferted.

Thefe cafts, or jets, are all terminated with a kind of plugs, which are kept clofe, that, upon opening the furnace, the brafs, which gufhes out with violence, may not enter any of them, till the bafon be full enough of matter to run into them all at once. Upon which occafion, they pull out the plugs, which are long iron-rods with a head at one end, capable of filling the whole diameter of each tube. The whole of the furnace is opened with a long piece of iron fitted at the end of each pole, and the mould filled in an inftant. This completes the work in relation to the cafting part; the reft being the fculptor's or carver's bufinefs, who taking the figure out of the mould, and earth, wherewith it is encompaffed, faws off the jets with which it appears covered over, and repairs it with chiffels, gravers, puncheons, *&c.*

FOUNDERY OF BELLS. The metal, it is to be obferved, is different for bells, from what it is for ftatues; there being no tin in the ftatue-metal: but there is a fifth,

and

and sometimes more, in the bell-metal. See the article BELL.

The dimensions of the core, and the wax, for bells, if a ring of bells especially, are not left to chance, but must be measured on a scale, or diapason, which gives the height, aperture, and thickness necessary for the several tones required. See the article DIAPASON.

It is on the wax that the several mouldings and other ornaments are formed to be represented in relievo, on the outside of the bell.

The business of bell-foundery is reducible to three particulars. 1. The proportion of a bell. 2. The forming of the mould; and, 3. The melting of the metal.

The proportions of our bells differ much from those of the Chinese: in ours the modern proportions are to make the diameter fifteen times the thickness of the brim, and twelve times the height.

There are two kinds of preparations, *viz.* the simple and the relative: the former are those proportions only that are between the several parts of a bell, to render it sonorous; the relative proportions establish a requisite harmony between several bells.

The particulars necessary for making the mould of a bell, are, 1. The earth: the most cohesive is the best: it must be well ground and sifted, to prevent any chinks. 2. Brick-stone; which must be used for the mine, mould, or core, and for the furnace. 3. Horse dung, hair, and hemp, mixed with the earth, to render the cement more binding. 4 The wax for inscriptions, coats of arms, *&c.* 5. The tallow equally mixed with the wax, in order to put a slight lay of it upon the outer mould, before any letters are applied to it. 6. The coals to dry the mould.

For making the mould, they have a scaffold consisting of four boards, ranged upon tressels. Upon this, they carry the earth, grossly diluted, to mix it with horse-dung, beating the whole with a large spatula.

The compasses of construction is the chief instrument for making the mould, which consist of two different legs, joined by a third piece. And last of all, the founders shelves, on which are the engravings of the letters, cartridges, coats of arms, *&c.*

They first dig a hole, of a sufficient depth to contain the mould of the bell, together with the case, or cannon, under ground; and about six inches lower than the terreplain, where the work is performed. The hole must be wide enough for a free passage between the mould and walls of the hole; or between one mould and another, when several bells are to be cast. At the center of the hole is a stake erected, that is strongly fastened in the ground. This supports an iron-peg, on which the pivot of the second branch of the compasses turns. The stake is encompassed with a solid brick-work, perfectly round, about half a foot high, and of the proposed bell's diameter. This they call a mill stone. The parts of the mould are the core, the model of the bell, and the shell. When the outer surface of the core is formed, they begin to raise the core, which is made of bricks that are laid in courses of equal height upon a lay of plain earth. At the laying each brick, they bring near it the branch of the compasses, on which the curve of the core is shaped, so as that there may remain between it and the curve the distance of a line, to be afterwards filled up with layers of cement. The work is continued to the top, only leaving an opening for the coals to bake the core. This work is covered with a layer of cement, made of earth and horse-dung, on which they move the compasses of construction, to make it of an even smoothness every where.

The first layer being finished, they put the fire to the core, by filling it half with coals, through an opening that is kept shut, during the baking, with a cake of earth, that has been separately baked. The first fire consumes the stake, and the fire is left in the core half, or, sometimes, a whole day: the first layer being thoroughly dry, they cover it with a second, third, and fourth; each being smoothed by the board of the compasses, and thoroughly dried before they proceed to another.

The core being completed, they take the compasses to pieces, with intent to cut off the thickness of the model, and the compasses are immediately put in their place, to begin a second piece of the mould. It consists of a mixture of earth and hair, applied with the hand on the core, in several cakes that close together. This work is finished by several layers of a thinner cement of the same matter, smoothed by the compasses,

and thoroughly dried, before another is laid on. The first layer of the model is a mixture of wax and grease spread over the whole. After which are applied the inscriptions, coats of arms, &c. besmeared with a pencil dipped in a vessel of wax in a chaffing-dish: this is done for every letter. Before the shell is begun, the compasses are taken to pieces, to cut off all the wood that fills the place of the thickness to be given to the shell.

The first layer is the same earth with the rest, sifted very fine; whilst it is tempering in water, it is mixed with cow's hair, to make it cohere. The whole being a thin cullis, is gently poured on the model, that fills exactly all the sinuosities of the figures, &c. and this is repeated till the whole is two lines thick over the model. When this layer is thoroughly dried, they cover it with a second of the same matter, but something thicker: when this second layer becomes of some consistence, they apply the compasses again, and light a fire in the core, so as to melt off the wax of the inscriptions, &c.

After this, they go on with other layers of the shell, by means of the compasses. Here they add to the cow's hair a quantity of hemp, spread upon the layers, and afterwards smoothed by the board of the compasses. The thickness of the shell comes to four or five inches lower than the mill-stone before observed, and surrounds it quite close, which prevents the extravasation of the metal. The wax should be taken out before the melting of the metal.

The ear of the bell requires a separate work, which is done during the drying of the several incrustations of the cement. It has seven rings, the seventh is called the bridge, and unites the others, being a perpendicular support to strengthen the curves. It has an aperture at the top, to admit a large iron-peg, bent at the bottom; and this is introduced into two holes in the beam, fastened with two strong iron-keys. There are models made of the rings, with masses of beaten earth, that are dried in the fire, in order to have the hollow of them. These rings are gently pressed upon a layer of earth and cow's hair, one half of its depth; and then taken out, without breaking the mould. This operation is repeated twelve times for twelve half-moulds, that two and two united may make the hollows of the six rings; the same they do for the hollow of the bridge, and bake them all, to unite them together.

Upon the open place left for the coals to be put in, are placed the rings that constitute the ear. They first put into this open place the iron-ring to support the clapper of the bell; then they make a round cake of clay, to fill up the diameter of the thickness of the core. This cake, after baking, is clapped upon the opening, and soldered with a thin mortar spread over it, which binds the cover close to the core.

The hollow of the model is filled with an earth, sufficiently moist, to fix on the place, which is strewed, at several times, upon the cover of the core; and they beat it gently with a pestle, to a proper height; and a workman smooths the earth at top with a wooden trowel dipped in water.

Upon this cover, to be taken off afterwards, they assemble the hollows of the rings. When every thing is in its proper place, they strengthen the outsides of the hollows with mortar, in order to bind them with the bridge, and keep them steady at the bottom, by means of a cake of the same mortar, which fills up the whole aperture of the shell. This they let dry, that it may be removed without breaking. To make room for the metal they pull off the hollows of the rings, through which the metal is to pass, before it enters into the vacuity of the mould. The shell being unloaded of its ear, they range under the mill-stone five or six pieces of wood, about two feet long, and thick enough to reach almost the lower part of the shell; between these and the mould they drive in wooden wedges with a mallet, to shake the shell of the model whereon it rests, so as to be pulled up, and got out of the pit.

When this and the wax are removed, they break the model and the layer of earth, through which the metal must run, from the hollow of the rings, between the bell and the core. They smoke the inside of the shell, by burning straw under it, that helps to smooth the surface of the bell. Then they put the shell in the place, so as to leave the same interval between that and the core; and before the hollows of the rings or the cap are put on again, they add two vents, that are united to the rings, and to each other, by a mass of baked cement. After which they put on this mass of the cap, the rings,

rings, and the vent, over the ſhell, and ſolder it with thin cement, which is dried gradually by covering it with burning coals. Then they fill up the pit with earth, beating it ſtrongly all the time, round the mould.

The furnace has a place for the fire, and another for the metal. The fire-place has a large chimney with a ſpacious aſh-hole. The furnace which contains the metal, is vaulted, whoſe bottom is made of earth, rammed down; the reſt is built with brick. It has four apertures; the firſt, through which the flame reverberates; the ſecond is cloſed with a ſtopple that is opened for the metal to run; the others are to ſeparate the droſs, or ſcoriæ, of the metal by wooden rakes: through theſe laſt apertures paſſes the thick ſmoke. The ground of the furnace is built ſloping, for the metal to run down.

FOUNDERY *of great guns and mortar pieces.* The method of caſting theſe pieces is little different from that of bells: they are run maſſy, without any core, being determined by the hollow of the ſhell; and they are afterwards bored with a ſteel trepan, that is worked either by horſes, or a water-mill.

For the metal, parts, proportions, *&c.* of theſe pieces, ſee CANNON.

Letter FOUNDERY, or *Caſting of printing letters.* The firſt thing requiſite is to prepare good ſteel-punches, on the face of which is drawn the exact ſhape of the letter with pen and ink, if the letter be large, or with a ſmooth blunted point of a needle, if ſmall; and then, with proper gravers, the cutter digs deep between the ſtrokes, letting the marks ſtand on the punch; the work of hollowing being generally regulated by the depth of the counter punch: then he files the outſide, till it is fit for the matrice.

They have a mould to juſtify the matrices by, which conſiſts of an upper and under part, both which are alike, except the ſtool and ſpring behind, and a ſmall roundiſh wire in the upper part, for making the nick in the ſhank of the letter. Theſe two parts are exactly fitted into each other, being a male and female gage, to ſlide backwards and forwards. See the article GAGE.

Then they juſtify the mould, by caſting about twenty ſamples of letters, which are ſet in a compoſing-ſtick, with the nicks towards the right hand; and comparing theſe every way with the pattern-letters, ſet up in the ſame manner, they find the exact meaſure of the body to be caſt.

Next they prepare the matrix, which is of braſs or copper, an inch and a half long, and of a proportionable thickneſs to the ſize of the letter it is to contain. In this metal is ſunk the face of the letter, by ſtriking the letter-punch the depth of an *n.* After this, the ſides and face of the matrice are juſtified, and cleared, with files, of all bunchings that have been made by ſinking the punch.

Then it is brought to the furnace, which is built upright of brick with four ſquare ſides, and a ſtone at top, in which is a hole for the pan to ſtand in. They have ſeveral of theſe furnaces. See the article FURNACE.

Printing-letters are made of lead, hardened with iron or ſtub-nails. To make the iron run, they mingle an equal weight of antimony, beaten ſmall in an iron mortar, and ſtub-nails together. They charge a proper number of earthen pots, that bear the fire, with the two ingredients, as full as they can hold, and melt it in an open furnace, built for that purpoſe. See the article FLUX.

When it bubbles, the iron is then melted, but it evaporates very much. This melted compoſt is ladled into an iron-pot, wherein is melted lead, that is fixed on a furnace cloſe to the former, 3 ℔ of melted iron to 25 ℔ of lead; this they incorporate according to art.

The caſter taking the pan off the ſtone, and having kindled a good fire, he ſets the pan in again, and metal in it to melt. If it be a ſmall-bodied letter, or a thin letter with great bodies, that he intends to caſt, his metal muſt be very hot, and ſometimes red hot, to make the letter come. Then taking a ladle, of which he has ſeveral ſorts, that will hold as much as will make the letter and break, he lays it at the hole where the flame burſts out; then he ties a thin leather, cut with its narrow end againſt the face, to the leather groove of the matrice, by whipping a brown thread twice about the leather groove, and faſtening the thread with a knot. Then he puts both pieces of the mould together, and the matrice into the matrice-cheek; and places the foot of the matrice on the ſtool of the mould, and the broad end of the leather on the wood of the upper haft of the mould, but not tight up, leſt it hinder the foot of the matrice from ſinking cloſe down upon the ſtool, in a train of work.

Afterwards laying a little rosin on the upper part of the mould, and having his casting-ladle hot, he, with the boiling side, melts the rosin and presses the broad end of the leather hard down on the wood and so fastens it thereto. Now he comes to casting, when placing the under half of the mould in his left hand, with the hook or jag forward, he holds the ends of its wood between the lower part of the ball of his thumb and his three hinder fingers; then he lays the upper half of the mould upon the under half, so as the male gages may fall into the female; and, at the same time, the foot of the matrice places itself upon the stool, and clasping his left hand thumb strongly over the upper half, he nimbly catches hold of the bow or spring, with his right hand fingers at the top of it, and his thumb under it, and places the point of it against the middle of the notch in the backside of the matrice, pressing it forwards as well towards the mould, as downwards, by the shoulder of the notch, close upon the stool, while at the same time with his hinder fingers, as aforesaid, he draws the under half of the mould towards the ball of his thumb, and thrusts, by the ball of his thumb, the upper part towards his fingers, that both the registers of the mould may press against both sides of the matrice, and his thumb and fingers press both sides of the mould close together.

Then he takes the handle of his ladle in his right hand, and with the ball of it gives two or three strokes outwards upon the surface of the melted metal, to clear it of the scum; then he takes up the ladle full, and having the mould in the left hand, turns his left side a little from the furnace, and brings the geat of his ladle to the mouth of the mould; and turns the upper part of his right hand towards him, to pour the metal into it, while, at the same instant, he puts the mould in his left hand forwards, to receive the metal with a strong shake, not only into the bodies of the mould, but, while the metal is yet hot, into the very face of the matrice, to receive its perfect form there as well as in the shank. Then he takes the upper half of the mould off, by placing his right thumb on the end of the wood next his left thumb, and his two middle fingers at the other end of the wood: he tosses the letter, break and all, out upon a sheet of waste paper, laid on a bench, a little beyond his left hand; and then is ready to cast another letter, as before, and likewise the whole number in that matrix.

Then, boys, commonly employed for this purpose, separate the breaks from the shanks, and rub them on a stone, and afterwards a man cuts them all of an even height, which finishes the fount for the use of the printer. See the next article.

A workman will ordinarily cast 3000 of these letters in a day. The perfection of letters thus cast, consists in their being all severally square and straight on every side; and all generally of the same height, and evenly lined, without stooping one way or other; neither too big in the foot, nor the head; well grooved, so as the two extremes of the foot contain half the body of the letter; and well ground, barbed, and scraped, with a sensible notch, *&c.* See the article PRINTING.

FOUNT, or FONT, among printers, a set or quantity of letters, and all the appendages belonging thereto, as numeral characters, quadrates, points, *&c.* cast by a letter-founder, and sorted. Founts are large or small, according to the demand of the printer, who orders them by the hundred weight, or by sheets. When a printer orders a fount of five hundred, he means that the fount, consisting of letters, points, spaces, quadrates, *&c.* shall weigh 500 lb. When he demands a fount of ten sheets, it is understood, that with that fount he shall be able to compose ten sheets, or twenty forms, without being obliged to distribute. The founder takes his measures accordingly; he reckons 120 lb. for a sheet, including the quadrates, *&c.* or 60 lb. for a form, which is only half a sheet: not that the sheet always weighs 120 lb. or the form 60 lb. on the contrary, it varies according to the size of the form; besides, it is always supposed that there are letters left in the cases. As therefore every sheet does not comprehend the same number of letters, nor the same sort of letters, we must observe, that, as in every language some sounds recur more frequently than others, some letters will be in much more use, and oftener repeated than others, and consequently their cells or cases should be better stored than those of the letters which do not recur so frequently: thus, a fount does not contain an equal number of *a* and *b*, or of *b* and *c*, *&c.* the letter-founders have therefore a list or tariff, or, as the French call

call it, a *police*, by which they regulate the proportions between the different sorts of characters that compose a fount; and it is evident that this tariff will vary in different languages, but will remain the same for all sorts of characters employed in the same language.

FOUNTAIN, *fons*, in philosophy, a spring or source of water rising out of the earth. Among the antients, fountains were held sacred, and even worshipped as a kind of divinities. For the phænomena, theory, and origin of fountains or springs, see the article SPRING.

FOUNTAIN, or *Artificial* FOUNTAIN, in hydraulics, called also a *jet d'eau*, is a contrivance by which water is violently spouted upwards.

The theory of fountains, in regard to the action of the several parts of a fluid upon each other, depends on the following principles. It has been shewn, under the article FLUID, that water coming from a reservoir, as A B C D (plate CV. nº 1.) through the pipe E F G H, will rise from the lowest part, G, to the same altitude H, in the part G H, as is upon a level with the surface of the water A B, in the reservoir: and also, that it thus rose from the point G, by a force of pressure proportional to the altitude of the water in the reservoir, which is equal to the altitude G H. Now it is very evident that the tube G H itself can contribute nothing towards the waters rising in it; on the contrary it rather impedes the ascent, by the friction it occasions to the particles which move against the internal surface thereof. Therefore, if the part G H be taken away, the water would rise to the same height H, excepting so far as it is obstructed by other concurring incidents; for in all fountains the height G I is somewhat less than G H, the height of the tube for the following reasons: 1. The air's resistance is an obstruction to the jet, and diminishes its height; and since we know that the resistance of fluids is proportional to the squares of the velocity, and the deficiency of the height H I is proportional to the resistance; therefore a jet that plays with a double velocity, will have that deficiency four times as great; and, with three times the velocity, nine times as great, and so on. 2. The second impediment is the friction against the sides of the hole, and the adjutage at G; and since this is in proportion to the quantity of surface in the hole, it will be greater in a small hole than in a great one, in respect to the body of the spouting water; because the jet will increase in magnitude with the square of the diameter of the hole, whereas the resistance will increase only with the diameter simply: or, a hole with twice the diameter emits four times the water, and gives but twice the resistance: this makes a small jet rise to less height than a large one from the same fountain. 3. A third impediment arises from hence, that since all the particles set out from G, with an equal velocity, and this velocity is continually diminishing, it follows, that the velocity of the inferior parts is greater than the velocity of the parts above them, and therefore must in some degree strike against them: by which impulse, since fluids move every way, the particles will be urged side-ways, and the column of the jet become wider, and consequently shorter than it would otherwise be. 4. The fourth cause why jets do not rise to the height of the reservoirs, is because the water upon the top of the jet does not immediately run off, but spreading into a head, lies with its weight upon the ascending water below, and hinders it from rising so high as it would otherwise do: this will appear by inclining the jet a little, that the upper water may not bear upon the rising stream; for the jet will then play higher, but be less beautiful.

If the hole of the adjutage G be less than a quarter of an inch in diameter, the force of the attraction of cohesion will extend itself through the body of the jet at the hole, and greatly obstruct its ascent: whence all jets of larger fountains, such as are in gentlemen's gardens, ought to exceed a quarter of an inch in diameter, and that in proportion to the height of the reservoir.

And one thing more is necessary to be known, that the jet may play the highest possible, *viz.* that the part of the conduit pipe at the adjutage, does not turn up at right angles, but with a gentle easy curve; that is, not as at G, but as at L, where the jet plays to a greater height at K: the upright part at G directly resists the water coming from F, whereas the curve at L causes the impulse of the water against it to be oblique; and therefore a less part of its momentum will be destroyed, and consequently the greater remaining force will throw the jet the higher.

A Table of the height to which jets will riſe, in feet and decimal parts, from reſervoirs on an height of five feet to an hundred and fifty feet.

Ref.	Jet.	Ref.	Jet.	Ref.	Jet.	Ref.	Jet.
5	4,91	31	28,32	57	48,99	83	67,71
6	5,88	32	29,16	58	49,74	84	68,40
7	6,84	33	30,00	59	50,49	85	69,08
8	7,80	34	30,83	60	51,24	86	69,76
9	8,74	35	31,63	61	51,99	87	70,47
10	9,68	36	32,47	62	52,73	88	71,14
11	10,62	37	33,29	63	53,47	89	71,81
12	11,58	38	34,11	64	54,20	90	72,48
13	12,48	39	34,93	65	54,93	91	73,15
14	13,40	40	35,74	66	55,66	92	73,82
15	14,31	41	36,55	67	56,39	93	74,49
16	15,22	42	37,35	68	57,12	94	75,16
17	16,13	43	38,14	69	57,84	95	75,83
18	17,03	44	38,93	70	58,56	96	76,49
19	17,93	45	39,75	71	59 28	97	77,15
20	18,82	46	40,53	72	60,00	98	77,81
21	19,70	47	41,31	73	60,71	99	78,47
22	20,58	48	42,09	74	61,42	100	79,12
23	21,46	49	42,87	75	62,13	110	85,58
24	22,33	50	43,65	76	62,84	120	91,86
25	23,20	51	44,42	77	63,54	130	97,99
26	24,06	52	45,19	78	64,24	140	103,97
27	24,92	53	45,96	79	64,94	150	107,87
28	25,78	54	46,72	80	65,64		
29	26,63	55	47,48	81	66,33		
30	27,48	56	48,24	82	67,02		

From what has been ſaid upon the ſecond cauſe aſſigned for the obſtruction the jet meets with in riſing to the height of the reſervoir, which is the friction againſt the ſides of the hole and the adjutage, it appears, *cæteris paribus*, that the hole in the adjutage ought to be made in a thin plate of braſs, and not through the bore of a tube of any length, becauſe of the quantity of ſurface in ſuch an adjutage-piece which muſt greatly retard the jet, and diminiſh the height.

If the conduit-pipe E F G be not of a proper ſize to ſupply water as faſt as it can be expended at the adjutage G, the jet will likewiſe be checked, and it will not riſe to the full height. To aſcertain the proportion of the conduit-pipe to the bore of the adjutage, is ſhewn by the following table, made by Mr. Mariotte, Dr. Deſaguliers, and others, who, by various experiments, found that if the reſervoir be 5 feet high, a conduit pipe 1 $\frac{3}{4}$ inch diameter will admit a hole in the adjutage from $\frac{1}{4}$ of an inch to $\frac{3}{8}$ of an inch; and ſo on, as in the following table:

Height of the reſervoir.	Diameter of the adjutages.	Diameter of the pipes of conduit.
Feet.	Inch.	Inch.
5	$\frac{1}{4}$ to $\frac{3}{8}$	1 $\frac{3}{4}$
10	$\frac{1}{4}$ to $\frac{1}{2}$	2
15	$\frac{1}{2}$	2 $\frac{1}{4}$
20	$\frac{1}{2}$	2 $\frac{1}{2}$
25	$\frac{1}{2}$	2 $\frac{3}{4}$
30	$\frac{1}{2}$ to $\frac{3}{4}$	3 or 3 $\frac{1}{2}$
40	$\frac{3}{4}$	4 $\frac{1}{4}$
50	$\frac{3}{4}$	5
60	1	5 $\frac{3}{4}$
80	1$\frac{1}{4}$	6 $\frac{1}{2}$
100	1$\frac{1}{4}$ or 1$\frac{1}{2}$	7 or 8

Here the jet is ſuppoſed to be within 100 or 150 yards of the reſervoir; but if the conduit-pipe much exceeds this length, it muſt be of a larger diameter than what is here aſſigned: thus, for jets from $\frac{3}{4}$ of an inch, to thoſe of an inch, and from reſervoirs from 40 to 90 feet height, if the diſtance be from 150 yards to $\frac{1}{4}$ of a mile, the diameter of the pipe ſhould be of 6 inches; from $\frac{1}{4}$ of a mile to 2 miles it muſt be of 7 inches; and from 2 miles to 5, it muſt be 8 inches diameter for the ſame jets. If it be required to keep any number of jets playing, whoſe adjutages are given in diameter by one common conduit-pipe, we muſt find the diameter of an adjutage equal to all the given ones: thus, if there be four adjutages of $\frac{3}{4}$ of an inch each, then the ſquare of $\frac{3}{4}$ is $\frac{9}{16}$, which multiplied by the number of adjutages 4, makes $\frac{36}{16}$, the ſquare root of which is $\frac{6}{4} = 1\frac{1}{2} =$ the diameter of the adjutage, equal to all the four ſmall ones. A pipe of conduit of 10 inches diameter will ſupply all the jets, as being a little more than ſix times as great as the diameter of the one large adjutage now found. After this manner the dimenſions of a conduit pipe may be found for any number of adjutages.

A fountain that ſhall ſpout the water in various directions is made as follows: ſuppoſe the vertical tube in which the water riſes, to be A B (*ibid.* n° 2.) in this fit ſeveral other tubes, ſome horizontal, others oblique, ſome inclining, others reclining, L, O, P, A, N, *&c.* then as all water retains the direction of the aperture through which it is ſpouted, that iſſuing through A will riſe perpendicularly,

larly, and that through L, H, N, P, O, will describe arches of different magnitudes, tending different ways.

Or thus: suppose the vertical tube A B (*ibid.* n° 3.) to be stopped at top, as at A; and instead of pipes, or jets, let it be only perforated with little holes all round, or only half its surface; then will the water spout forth in all directions through the little apertures, to a distance proportioned to the height of the fall of the water.

A ball, A, if its weight be not too heavy, being laid in the bottom of the cup or bason B (*ibid.* n° 4.) will be taken up in the stream, and sustained at a considerable height, as A; alternately vibrating, or playing up and down, provided the tube B C, through which the water rises, be exactly perpendicular to the horizon.

The ball may be made of a thin plate of brass, or any other light metal; but as its figure of a ball contributes nothing to its reciprocal rise and fall, any other body, not too heavy, may be substituted in place thereof. As it is necessary that the body sustained by the jet, should keep the same precise perpendicular on its descent and rise, since otherwise it would miss the stream, such a fountain should be played in a place free from wind.

A fountain may be made to spout water in manner of a shower, by fitting a spherical or lenticular head A B (*ibid.* n° 5.) made of a plate of metal, and perforated at top with a great number of little holes; for the water, rising with a certain velocity towards A B, will there be divided in innumerable little threads, and afterwards be broke and dispersed into small drops.

A fountain may be made to spread the water in form of a cloth, by soldering two spherical segments C and D (*ibid.* n° 6.) so close together as to be almost touching one another, with a screw E, to contract or amplify the interstice, or chink, at pleasure: then this spherical head being fitted upon the tube, the water spouting through the chink, will expand itself in manner of a cloth.

The theory of fountains, with regard to the action of air upon water by condensation and rarefaction, may be sufficiently understood from what has been delivered under the articles FLUID, AIR, ENGINE, CONDENSATION, RAREFACTION, and ELASTICITY; whence it appears, that condensed air injected into any vessel containing water, will, by means of its elasticity, cause the water to spout out thro' an adjutage to an height proportionable to the spring of the condensed air. Upon this principle the following fountain A B (*ibid.* n° 7.) depends, where the air is condensed at the top of the water by a syringe, and the air and water retained by the cock at C, so that the fountain cannot play till you open the cock; then the water strongly pressed by the condensed air at S S, goes through the pipe *o*, and the adjutage *b*, with great force, in jets of several figures, according to the spouting-pipes, put on at *b*.

As here the air is compressed by a syringe, in the fountain (*ibid.* n° 8.) the air being only compressed by the concealed fall of water, makes a jet, which, seen for a while, is looked on as a perpetual motion by the ignorant, who think that the same water that fell from the jet, rises again.

The boxes C E, and D Y X, being close, you see only the bason A B W, with a hole at W, into which the water, spouting out at B, falls; but that water going down the hole W, does not come up again at W, but runs down through the pipe W X, into the box D Y X, from whence it drives out the air thro' the ascending pipe Y Z, into the cavity of the box C E, where, pressing upon the water that is in it, it forces it out through the spouting-pipe O B, as long as there is any water in C E; so that this whole play is only while the water contained in C E, having spouted out, falls down through the pipe W X, into the cavity DYX. The force of the jet is proportionable to the height of the pipe W X, or of the boxes C E and D Y, above one another. The height of the water measured from the bason A B W, to the surface of the water in the lower box D Y X is always equal to the height measured from the top of the jet to the surface of the water in the middle cavity at C E. Now since the surface C E is always falling, and the water D Y is always rising, the height of the jet must continually decrease, till it is shorter by the heighth of the depth of the cavity C E, which is emptying, added to the depth of the cavity D Y, which is always filling, and when the jet is fallen so low, it immediately gives over.

The way to prepare this fountain for playing, is as follows: first, pour in water at W, till you have filled the cavity

DXY;

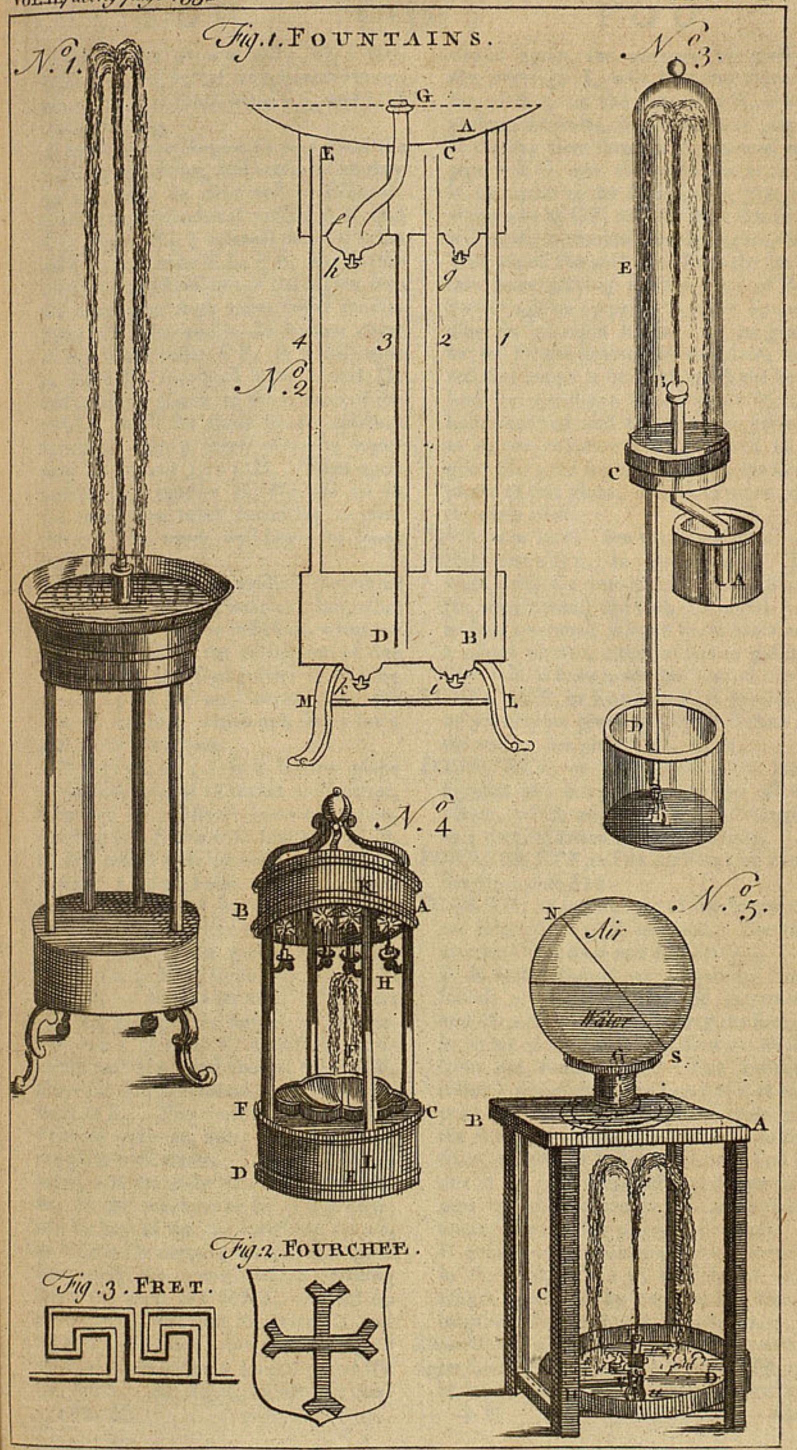
D X Y; then turn the fountain over, and the water will run from the cavity D X Y into the cavity C E, which you will know to be full when the water runs out at B, held down; ſet the fountain up again, and pour in about a pint of water into the baſon A B W, and ſo ſoon as it has filled the pipe W X, the fountain will play, and continue ſo long as there is any water in C E. You may then pour back the water left in the baſon A B W, into any veſſel, and invert the fountain; which being ſet upright again, will be ſet a playing by putting back the water poured out into A B W.

A fountain, which, when it has done ſpouting, may be turned up like an hour-glaſs, is made as follows: provide two veſſels, A F H and B D G (*ib.* n° 9.) of a capacity proportionable to the time the fountain is required to play without turning up, and placed at ſo much the greater diſtance from each other as the water is required to ſpout the higher: the water contained in the cavity A F H, runs down the curve pipe C D E, and ſpouts up through the jet E, by the preſſure of the column of water C D; but unleſs the pipe G F, was open at G, to let the air run up to F, and preſs at the top of the ſurface of the water in the cavity A, the water would not run down and ſpout out at E: there is ſuch another pipe as G K, belonging to the cavity B, through which the water of the jet is received into the baſon, ſupplies the cavity B, whilſt the fountain ſtands on the end B; but when the fountain is inverted, it ſupplies B with air, to let the water deſcend in the direction G H I, I becoming the ſpouting-pipe. Wherefore, by turning the machine upſide down, the water ſpouts up through the cock at G, and the veſſel A H C, will be the reſervoir. Hence, if the veſſels A F H and D K B contain juſt as much water as will be ſpouted up in an hour's time, we ſhall have a ſpouting clepſydra, which may be graduated or divided into quarters, minutes, &c. See the article Clepsydra.

The fountain (plate CVI. n° 1.) is upon the ſame principle, and of the ſame kind with n° 8. plate CV. but having double the number of pipes and concealed cavities, it plays as high again. N° 2. muſt be examined, to ſee its cavities and pipes, where the baſon is A, and the four cavities B, C, D, and E, from which the water from the pipe *f* G, ſpouts out to double the height of the fountain; the air at E, which drives it, being doubly condenſed. The water going down the pipe 1 (ſuppoſe it three feet long) condenſes the air that goes up into the cavity C, through the pipe 2, ſo as to make it $\frac{1}{10}$ ſtronger than the common air; then the water which falling in the pipe 3, from C to D, is capable by the height of its fall, to condenſe the air at E, ſo as to make it $\frac{1}{10}$ ſtronger, being puſhed at C by air already condenſed into $\frac{1}{10}$ leſs ſpace, cauſes the air at E to be condenſed twice as much; that is, to be $\frac{1}{5}$ ſtronger than the common air, ſo that it will make the water at G ſpout out with twice the force, and go to twice the height that it would do, if the fountain had been of the make of n° 8. pl. CV. The way to prepare this fountain for playing, is to turn it upſide down, and taking out the plugs *g*, *h*, to fill the two cavities C and E, and having ſhut the holes again, ſet the fountain upright, and pour ſome water into the baſon A, and the jet will play out at G.

Another way of making artificial fountains, is by the rarefaction of the air, in the manner following: A B and C D (*ibid.* n° 3.) are two pipes fixed to a braſs head C, to ſcrew into a glaſs-veſſel E which having a little water in it, is inverted, till the pipes are ſcrewed on; then reverting it ſuddenly, ſo as to put A the lower end of the ſpouting-pipe A B, into a jar of water A; and the lower end of the deſcending pipe C D, into a receiving veſſel D, the water will ſpout up from the jar A, into the tall glaſs veſſel E, from which it will go down at the orifice C, through the deſcending pipe C D, into the veſſel D, till the water is out of A (making a fountain in E), and has emptied itſelf into D.

The reaſon of the play in this fountain is this: the pipe C D being 2 feet 9 inches long, lets down a column of water which rarifies the air $\frac{1}{12}$ part in the veſſel E, where it preſſes againſt the water ſpouting at B, with $\frac{1}{12}$ leſs force than the water is puſhed up the hole A, by the preſſure of the common air on the water in the veſſel A; ſo that the water ſpouts up into E (when the air is rarified $\frac{1}{12}$) with the difference of the preſſure of the atmoſphere, and the aforeſaid rarified air; that is, of 33 to $2\frac{3}{4}$. This would raiſe the water 2 feet 9 inches, but the length of the pipe A, 9 inches, being deducted,



J. Jefferys sculp.

deducted, the jet will only rise 2 feet. This may be called a syphon-fountain, where A B is the driving leg, and C D the issuing leg.

A fountain that begins to play upon the lighting of candles, and ceases when they go out, may be contrived as follows: provide two cylindrical vessels A B and C D (*ibid.* n° 4.) connect them by tubes open at both ends K L, F B, &c. so that the air may descend out of the higher into the lower; to these tubes solder candlesticks, H, &c. and to the hollow cover of the lower vessel C F, fit a little tube or jet F E, furnished with a cock G, and reaching almost to the bottom of the vessel. In G let there be an aperture furnished with a screw whereby water may be poured into C D. Then upon lighting the candles H, &c. the air in the contiguous tubes becoming rarefied thereby, the water will begin to spout through E F.

There are many other artificial fountains made upon these principles; but what are explained may be sufficient, when we have added to it the description of one invented by Dr. Desaguliers to play by the spring of the air, increased by the heat of the sun, which also serves for a dial at the same time.

G N S (*ibid.* n° 5.) is a hollow globe of thin copper, of 18 inches in diameter, supported by a small inverted bason, standing on a frame with four legs A, B, C, &c. which have between them, at the bottom, a large bason of two feet diameter. Along the leg C comes a concealed pipe, going from G, the bottom of the inside of the globe, which pipe comes along H V to join in an upright pipe *u* I, to make a jet at I. The short pipe I *u* going to the bottom of the bason, has a valve at V, under the horizontal part H *u*, and another valve at V, above the said horizontal pipe, under the cock at K. The north pole N, has a screw to open an hole, whereby to fill the globe with water. Things thus prepared, and the globe half filled with water, let the machine be set in a garden; and the heat of the sun rarefying the air, as it heats the copper, the air will press hard upon the water, which coming down the pipe G C H V I, will lift up the valve V, but shut the valve *u*; and the cock being open, spout out at I, and continue to do so for a long time, if the sun shines. At night, as the air condenses again, the outward air pressing the adjutage I, will shut the valve V, but pressing on the bason D *u* H, it will push up the water, which has been played in the day time through the valve *u*, and pipe *u* H G into the globe, so as to fill it up again to the same height that the water was at first, and the next sun-shine will cause the fountain to play again, &c. The use of the cock is to keep the fountain from playing till the time of day that you think proper. A small jet will play six or eight hours. If the globe be set for the latitude of the place, and rectified before it be fixed, with the hour lines or meridians drawn upon it, the hours marked and the countries painted as in the common globe, it will be a good dial; the sun shining upon the same places in this globe, as it does upon the the earth itself.

FOUNTAIN PEN. See the article PEN.

FOUR CORNERS, in the manege. To work upon the four-corners, is to divide (in imagination) the volt, or round, into four quarters: when a horse has made a round or two, either at trot or gallop, he is said to have made the four-corners.

FOURCHE'E, or FOURCHY, in heraldry, an appellation given to a cross forked at the ends. See plate CVI. fig. 2.

FOURCHER, or FOURCHING, in law, signifies the delaying or putting off an action, which might have been brought to a determination in a shorter time.

FOURCHETTE, or FER DE FOUCHETTE. See the article FER.

FOURTH, in music, one of the harmonical intervals, called concords. See the articles CONCORD and INTERVAL.

It is called fourth, as containing four sounds or terms between its extremes, and three intervals; or as being the fourth in order of the natural or diatonic scale, from the fundamental. The antients called it diatessaron, and speak of it as the principal concord, on whose divisions all the rest depend; but the moderns, so far from allowing it such perfections, find it one of the most imperfect, and even dispute whether it ought to be received among the number of concords at all.

It consists in the mixture of two sounds in the ratio of 4 : 3; that is, of two sounds produced by two cords, whose lengths, &c. are in that proportion.

Diminished FOURTH. See DIMINISHED.

Superfluous FOURTH, a discord consisting of two tones major and one minor, called also

alſo triton: it is compoſed of the ratios 27 : 20, and 4 : 5. See DISCORD.

FOURTH-RATE. See the article RATE.

FOWEY, a borough town of Cornwall, which ſends two members to parliament: weſt long. 5°, and north lat. 50° 26′.

FOWL, among zoologiſts, denotes the larger ſorts of birds, whether domeſtic or wild: ſuch are geeſe, pheaſants, partridges, turkey, ducks, *&c.* See the articles GOOSE, PHEASANT, *&c.*

Tame fowl make a neceſſary part of the ſtock of a country farm. See the article POULTRY.

Fowls are again diſtinguiſhed into two kinds, *viz.* land and water fowl; theſe laſt being ſo called, from their living much in and about water: alſo into thoſe which are accounted game, and thoſe which are not. See the article GAME.

FOWLING, the art of catching birds by means of nets, bird-lime, decoys, and other devices. See the articles NET, BIRD-LIME, *&c.*

FOWLING is alſo uſed for the purſuing and taking birds with hawks, more properly called falconry. See FALCONRY.

FOWLING-PIECE, a light gun for ſhooting birds. That piece is always reckoned beſt which has the longeſt barrel, from 5½ to 6 feet, with a moderate bore; tho' every fowler ſhould have them of different ſizes, ſuitable to the game he deſigns to kill. The barrel ſhould be well poliſhed and ſmooth within, and the bore of an equal bigneſs from one end to the other; which may be proved, by putting in a piece of paſteboard, cut of the exact roundneſs of the top: for if this goes down without ſtops or ſlipping, you may conclude the bore good. The bridge-pin muſt be ſomewhat above the touch-hole, and ought to have a notch to let down a little powder; this will prevent the piece from recoiling, which it would otherwiſe be apt to do. As to the locks, chooſe ſuch as are well filed with true work, whoſe ſprings muſt be neither too ſtrong nor too weak. The hammer ought to be well hardened, and pliable to go down to the pan with a quick motion.

In ſhooting, obſerve to do it, if poſſible, with the wind, not againſt it; and rather ſideways, or behind the fowl, than full in their faces. Obſerve alſo to chooſe the moſt convenient ſhelter you can find, as a hedge, bank, tree, or the like. Take care to have your dogs under good command, that they may not dare to ſtir till you give the word, after diſcharging your piece: for ſome ill-taught dogs will, upon only the ſnap of the cock, preſently ruſh forward, and ſpoil your ſport. If you have not ſhelter enough, you muſt creep upon your hands and knees, or even make uſe of a ſtalking-horſe.

FOX, *vulpes*, in zoology, an animal of the dog-kind, which much reſembles the common dog in form, and is of the ſize of a ſpaniel: it is chiefly diſtinguiſhed by its long and ſtraight tail, with the tip white. See the articles CANIS and DOG.

The fox is a native of moſt northern countries. That of Siberia, is about the ſize of the common kind; but its head is larger, and its tail not only larger and more buſhy, but all of one colour. See plate CVII. fig. 1.

A fox in the firſt year is called a cub; in the ſecond, a fox; and afterwards an old fox. It is a beaſt of chace, uſually very prejudicial to the huſbandman, by taking away and deſtroying his lambs, geeſe, poultry, *&c.* The common way to catch him is by gins; which being baited, and a train made by drawing raw fleſh acroſs in his uſual paths or haunts to the gin, it proves an inducement to bring him to the place of deſtruction. They are alſo taken with grey-hounds, hounds, terriers, and nets. It is a commendable exerciſe to hunt theſe miſchievous beaſts, the nature of which in many reſpects is like that of wolves. See the article HUNTING.

FOX-GLOVE, *digitalis*, in botany. See the article DIGITALIS.

FOY, or ST. FOY, a town of Guienne, in France, thirty-two miles eaſt of Bourdeaux, it is ſituated under the meridian of London, in 44° 50′, north lat.

FOYLING OF LAND, the ſame with fallowing it. See the article FALLOWING.

FOYLING, among ſportſmen, denotes the footſteps of a ſtag on graſs or leaves.

FRACHES, in glaſs-making, flat iron-pans, wherein the new-made veſſels are put, to be removed gradually from the fire. See the article GLASS.

FRACTION, in arithmetic and algebra, is a part or parts of ſomething conſidered as an unite or integer.

Fractions are diſtinguiſhed into vulgar or common, and ſexageſimal and decimal. See the articles SEXAGESIMALS and DECIMAL.

Vulgar fractions, called alſo ſimply fractions, conſiſt of two parts or quantities, one wrote over the other, with a line between them. The quantity placed above

above the line is called the numerator of the fraction; and the quantity, placed under the line, the denominator. See the articles NUMERATOR and DENOMINATOR.

Thus, $\frac{2}{3}$ expreſſes the quotient of 2 divided by 3; and 2 is the numerator, and 3 the denominator. If the numerator of a fraction is equal to its denominator, then the fraction is equal to unity: Thus $\frac{4}{4}=1$, and $\frac{a}{a}$ or $\frac{b}{b}$ are likewiſe equal to unity. If the numerator is greater than the denominator, then the fraction is greater than unit. In both theſe caſes, the fraction is called improper. But if the numerator is leſs than the denominator, then the fraction is leſs than unit, and is called proper. Thus $\frac{5}{3}$ is an improper fraction, but $\frac{3}{4}$ or $\frac{2}{3}$ are proper fractions. A mixt quantity is that whereof one part is an integer, and the other a fraction; as $3\frac{4}{5}$, $5\frac{2}{3}$, and $a+\frac{a^2}{b}$. See the articles CHARACTER and NOTATION.

Problem I. To reduce a mixt quantity to an improper fraction, multiply the part that is an integer by the denominator of the fractional part; and, to the product, add the numerator; then place the former denominator under this ſum, and you will have the improper fraction required.

Thus, $2\frac{3}{5}$, reduced to an improper fraction, gives $\frac{13}{5}$; for $2\times5=10$, and $10+3=13$, which, divided by the former denominator 5, gives $\frac{13}{5}$. In the ſame manner $4\frac{1}{2}$, gives $\frac{9}{2}$; and $a+\frac{a^2}{b}$, gives $\frac{ab+a^2}{b}$; and $a-x+\frac{a^2-ax}{x}=\frac{a^2-x^2}{x}$.

Problem II. To reduce an improper fraction to a mixt quantity, divide the numerator of the fraction by the denominator, and the quotient ſhall give the integral part; and the remainder, ſet over the denominator, ſhall be the fractional part. Thus, $\frac{12}{5}=2\frac{2}{5}$; $\frac{ab+a^2}{b}=a+\frac{a^2}{b}$; $\frac{ax+2xx}{a+x}=x+\frac{x^2}{a+x}$; and $\frac{aa+xx}{a-x}=a+x+\frac{2xx}{a-x}$.

Problem III. To reduce fractions of different denominations to fractions of equal value, that ſhall have the ſame denominator; multiply each numerator, taken ſeparately, into all the denominators but its own, and the products ſhall give the new numerators: then multiply all the denominators into one another, and the product ſhall give the common denominator. Thus, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$, are reſpectively equal to $\frac{40}{60}$, $\frac{45}{60}$, and $\frac{48}{60}$, and $\frac{a}{b}$, $\frac{b}{c}$, and $\frac{c}{d}$ are reſpectively equal to $\frac{acd}{bcd}$, $\frac{bbd}{bcd}$, and $\frac{ccb}{bcd}$.

Problem IV. To add and ſubtract fractions, firſt reduce them to a common denominator (by Probl. III.) then add or ſubtract the numerators, and the ſum or difference ſet over the common denominator, will be the ſum or difference required. Thus, $\frac{2}{3}+\frac{3}{4}=\frac{8+9}{12}=\frac{17}{12}=1\frac{5}{12}$; and $\frac{3}{4}-\frac{2}{3}=\frac{9-8}{12}=\frac{1}{12}$. In the ſame manner, $\frac{a}{b}+\frac{c}{d}+\frac{e}{f}=\frac{adf+cbf+ebd}{bdf}$; $\frac{a}{b}-\frac{c}{d}=\frac{ad-cb}{bd}$; and $\frac{x}{2}-\frac{x}{3}=\frac{3x-2x}{6}=\frac{x}{6}$. See SUBSTRACTION.

Problem V. To multiply fractions; let their numerators be multiplied into one another, to obtain a new numerator, and the denominators into one another, to obtain a new denominator; and the numerator and denominator ſo found will be the product required.

Thus, $\frac{2}{3}\times\frac{4}{5}=\frac{8}{15}$; and $\frac{1}{2}\times\frac{2}{3}=\frac{2}{6}=\frac{1}{3}$. In the ſame manner, $\frac{a}{b}\times\frac{c}{d}=\frac{ac}{bd}$; and $\frac{a+b}{c}\times\frac{a-b}{d}=\frac{a^2-b^2}{cd}$.

If a mixt quantity is to be multiplied, firſt reduce it to the form of a fraction (by Probl. I.) and if an integer is to be multiplied by a fraction, you may reduce it to the form of a fraction, by placing unit under it. Thus, $5\frac{2}{3}\times\frac{3}{4}=\frac{17}{3}\times\frac{3}{4}=\frac{51}{12}=4\frac{1}{4}$, (by Probl. II.) Alſo $9\times\frac{2}{3}=\frac{9}{1}\times\frac{2}{3}=\frac{18}{3}=6$; and, in the ſame manner, $b+\frac{bx}{a}\times\frac{a}{x}=\frac{ba+bx}{a}\times\frac{a}{x}=\frac{a^2b+abx}{ax}=\frac{ab+bx}{x}$.

Problem VI. To divide fractions; firſt multiply the numerator of the dividend by

by the denominator of the divifor, and the product will be the numerator of the quotient; then multiply the denominator of the dividend by the numerator of the divifor, and their product will give the denominator of the quotient. Thus,

$\frac{4}{5})\frac{2}{3}(\frac{10}{12};\ \frac{3}{7})\frac{5}{8}(\frac{35}{24};\ \frac{c}{d})\frac{a}{b}(\frac{ad}{cb};$

and $\frac{a+b}{a-b})\frac{a-b}{a}(\frac{a^2-2ab+b^2}{a^2+ab}.$

These laft four problems are eafily demonftrated from the definition of a fraction. 1. It is obvious, that the fractions $\frac{a}{b}$, $\frac{c}{d}$, $\frac{e}{f}$, are refpectively equal to $\frac{adf}{bdf}$, $\frac{cbf}{bdf}$, $\frac{ebd}{bdf}$; fince if you divide adf by bdf, the quotient will be $\frac{a}{b}$; $\frac{cbf}{bdf}, =\frac{c}{b}$; and $\frac{ebd}{bdf}=\frac{e}{f}$. 2. Fractions reduced to the fame denominator are added by adding their numerators and fubfcribing the common denominator.

Thus, $\frac{a}{b}+\frac{c}{b}=\frac{a+c}{b}$; for call $\frac{a}{b}=m$, and $\frac{c}{b}=n$, and it will be $a=mb$, and $c=nb$; and $mb+nb=a+c$, and $m+n=\frac{a+c}{b}$; that is, $\frac{a}{b}+\frac{c}{b}$. After the fame manner, $\frac{a}{b}-\frac{c}{b}=m-n=\frac{a-c}{b}$.

3. Again, $\frac{a}{b}\times\frac{c}{d}$ $(=m\times n)=\frac{ac}{bd}$; for $bm=a$, $dn=c$; and $bdmn=ac$, and $mn=\frac{ac}{bd}$; that is, $\frac{a}{b}\times\frac{c}{d}=\frac{ac}{bd}$. 4. Laftly, $\frac{a}{b}\div\frac{c}{d}$, or $\frac{m}{n}$, gives $\frac{ad}{cb}$; for $mb=a$, and $mbd=ad$; $nd=c$, and $ndb=cb$: therefore $\frac{mbd}{ndb}=\frac{ad}{cb}$; that is, $\frac{m}{n}=\frac{ad}{cb}$.

Problem VII. To find the greateft common meafure of two numbers; that is, the greateft number that can divide them both without a remainder. Firft divide the greater number by the leffer, and if there is no remainder, the leffer number is the greateft common divifor required. If there is a remainder, divide your laft divifor by that remainder; and thus proceed, continually dividing the laft divifor by its remainder, till there is no remainder left; and then the laft divifor is the greateft common meafure required. Thus, the greateft common meafure of 45 and 63 is 9; and the greateft common meafure of 256 and 48, is 16, as appears from the operation at large.

```
45)63(1          48)256(5
   45               240
   18)45(2           16)48(3
      36                48
       9)18(2           00
         18
         00
```

Much after the fame manner, the greateft common meafure of algebraical quantities is difcovered; only the remainders that arife in the operation are to be divided by their fimple divifors, and the quantities are always to be ranged according to the dimenfions of the fame letter. Thus, to find the greateft common meafure of a^2-b^2 and $a^2-2ab+b^2$, the operation is thus:

$a^2-b^2)\ a^2-2ab+b^2\ (1$

a^2-b^2

$-2ab+2b^2$ remainder, which divided by $-2b$ is reduced to

$a-b)\ a^2-b^2\ (a+b.$

a^2-b^2

$0\ \ 0$

Therefore, $a-b$ is the greateft common meafure required.

The ground of this operation is, that any quantity that meafures the divifor and the remainder (if there is any) muft alfo meafure the dividend; becaufe the dividend is equal to the fum of the divifor multiplied into the quotient, and of the remainder added together. Thus, in the laft example, $a-b$ meafures the divifor a^2-b^2, and the remainder $-2ab+2b^2$; it muft therefore likewife meafure their fum $a^2-2ab+b^2$. You muft obferve, in this operation, to make that the dividend which has the higheft powers of the letter, according to which the quantities are ranged.

Problem VIII. To reduce any fraction to its loweft terms: find the greateft common meafure of the numerator and denominator; divide them by that common meafure, and place the quotients in their room, and you fhall have a fraction, equivalent to the given fraction, expreffed in the loweft terms. Thus, $\frac{3}{9}$ is reduced to $\frac{1}{3}$, by dividing the numerator and denominator by the greateft common meafure 3. In the fame manner $\frac{20}{25}=\frac{4}{5}$ for $\frac{20}{5}=4$, and $\frac{25}{5}=5$.

In algebraical terms, the operation is thus: $\frac{25bc}{25bc}\Big) \frac{75abc}{125bcx} = \frac{3a}{5x}$; which is found by rejecting the divisor (as being nothing) rejecting the letters bc of the dividend (as being common to numerator and denominator) and dividing the coefficients 75 and 125 by their greatest common measure 25; the result of which is $\frac{3a}{5x}$. In the same manner, $\frac{156a^2+156ab}{572a^2-572ab} = \frac{3a+3b}{11a-11b}$; $\frac{a^2-b^2}{a^2-2ab+b^2} = \frac{a+b}{a-b}$; $\frac{a^3-b^2a}{a^2+2ab+b^2} = \frac{a^2-ba}{a+b}$; and $\frac{a^4-b^4}{a^5-a^3b^2} = \frac{a^2+b^2}{a^3}$.

When unit is the greatest common measure of the numbers and quantities, then the fraction is already in its lowest terms. Thus, $\frac{3ab}{5dc}$ cannot be reduced lower. It ought also to be remarked, that numbers whose greatest common measure is unit, are said to be prime to each other.

If it is required to reduce a given fraction to a fraction equal to it, that shall have a given denominator; you must multiply the numerator by the given denominator, and divide the product by the former denominator; and this quotient, set over the given denominator, will be the fraction required. Thus, if it were required to reduce $\frac{2}{3}$ to an equal fraction, whose denominator shall be 6; find the quotient of $2 \times 6 \div 3 = 4$, then will $\frac{4}{6}$ be the fraction required. In the same manner, $\frac{a}{b}$ is reduced to an equal fraction, which has the denominator c, *viz.* $\frac{ac \div b}{c}$; for rejecting c out of both numerator and denominator, there remains $a \div b = \frac{a}{b}$.

For the method of reducing vulgar fractions to equal decimal ones, see the article Decimal.

It is observable, that when the last figure of the denominator of the fraction happens to be 1, 3, 7, or 9, then the decimal parts can never be precisely equal to the given fraction; yet by continuing the division, you may approximate to its value as near as you please. Thus $\frac{2}{3}$ = .666666, &c. as far as you please; and, in the same manner, $\frac{4}{7}$ = .5714285714, &c. Hence it may be farther observed, that these imperfect quotients return again, and circulate without end: in the first example, the circulation begins immediately; but, in the second, it does not begin again till the operation is continued to the seventh place; when the first six figures are repeated over again, constituting what is called the repetend of a decimal fraction.

These repetends sometimes also happen, when other figures, besides those above-mentioned, are the denominator of the fraction. Thus $\frac{1}{6}$ = .1666666, &c. *ad infinitum.*

FRACTURE, in surgery, a rupture of a bone, or a solution of continuity in a bone, when it is crushed or broken by some external cause.

Fractures generally happen when any part of the body, where a bone is situated, receives a violent shock, either by a fall, or a blow with a piece of timber, &c. or by the shot of a gun. There are instances where this accident has happened from an internal disorder, to wit, from the scurvy, a caries, or the venereal disease, which have rendered the substance of a bone so brittle, that it has been fractured without any apparent external accident. See Caries, Scurvy, &c.

Fractures are distinguished into several classes. First, every fracture is either simple, that is, when no other parts besides the bone are injured, or compound, as where there is a wound, a dislocation, hæmorrhage, inflammation, fever, caries, or contusion of the bone; or where the bone appears to be fractured in several places at the same time. Other differences arise with regard to the situation of the fracture; sometimes it happens in the cranium, ribs, vertebræ; sometimes in the upper or lower limbs; sometimes in the middle of the bone, and sometimes in either of the extremities. Again, some fractures are transverse, others oblique. In which case it frequently happens that the points of the bones wound the neighbouring parts, pushing quite through the muscular flesh, and common integuments; or at least pricking them grievously, and bringing on pain, inflammation, tumour, and spasm. Violent contusions also may be classed under the head of fractures; for the bones in this case are frequently broke into splinters, by the falling of any heavy body upon the part, or by any violent pressure. To fractures of the bones, we may also very

very properly add fiſſures. See the articles FISSURE, CONTUSION, &c.

Fractures of bones are diſcoverable, 1. By the eye, when the injured part is apparently ſhorter than the ſound; or when the patient cannot make uſe of it. 2. By the touch, when a preternatural inequality of the bone may be perceived; or that it bends in a part where nature did not intend it ſhould. 3. By the ear, when upon moving the limb, the cruſhing of the broken bones may be heard. 4. We may ſtrongly ſuſpect a fracture of the part, when it has received a violent blow. And, 5. It is obſervable that the parts are more ſubject to this injury in winter than in ſummer. Laſtly, 6. Sometimes, particularly in fractures that are made in a tranſverſe direction, the broken parts of the bone will immediately, of themſelves, recover their natural ſituation, and leave little room to ſuſpect the diſorder.

Great variety of miſchiefs attend a fractured bone, which differ, 1. With regard to the injured part, and the nature and diſpoſition of the neighbouring parts. 2. With regard to the manner in which fractures are made; for oblique fractures, and thoſe whoſe ſplinters and points wound and vellicate the neighbouring parts, are much more painful and dangerous than tranſverſe fractures. 3. We may judge of the miſchief that is likely to attend a fracture, from the number of pieces into which the bone is broken. And, 4. By obſerving whether the fracture happened at the middle of the bone, or at its extremities. The principal inconveniencies that attend a fracture are theſe: the patient loſes the uſe of the limb; the lower part of the limb will be contracted by the muſcles, which will make it appear diſtorted and deformed; the laceration of the perioſteum and the veſſels of the medulla being in great danger of fiſtulæ and caries. When the nerves are pricked and irritated by ſplinters, the patient ſuffers great pain, convulſions, inflammations, and fever; and if any veſſels ſuffer preſſure, the common conſequences of a contuſion enſue. Sometimes, whilſt the bone is uniting, the broken parts are ſupplied in too plentiful a manner with juices, and the callus is formed irregularly, which occaſions a deformity of the limb. See CALLUS.

In the cure of fractures, the ſurgeon's principal care ſhould be to unite the broken bone, to which three things are neceſſary. 1. That the bone be reſtored to its natural ſituation, which is done by extending and replacing it. 2. That after the bone has recovered its natural ſituation, it be kept there, by giving it reſt, and applying proper bandages. Laſtly, proper remedies muſt be uſed, in order to prevent or remedy the diſorders that uſually attend this accident. See the articles INFLAMMATION, FEVER, &c.

When the fractured bones maintain their natural ſituation, you are under no neceſſity of extending or replacing the limb, but of applying a proper bandage; but when the fractured parts recede from each other, ſome degree of extenſion is neceſſary. See the article EXTENSION *of fractured limbs*.

Sometimes you will be troubled with ſplinters of the bone in your way, which render the reduction of the bone very difficult. If the ſplinters are free, and have no connection with the bone, you muſt remove them carefully. When they adhere to the principal parts, you ſhould endeavour to replace them with the greateſt exactneſs; and where they cannot be reduced or re-united with the bone, they may be removed by a ſtrong pointed forceps. If they are concealed under the ſkin, you muſt endeavour to reduce them to their natural ſituation: if this cannot be done, make an inciſion through the ſkin, and take them out.

The bones being properly replaced, the next thing to be done is to ſecure them in their ſituation, that they may unite to the beſt advantage.

To this end two things are chiefly required. 1. To bind it up properly. And, 2. To lay the limb in a convenient poſture. The apparatus for ſecuring the ſituation of the limb is compoſed of bandages, bolſters, and ſplints. See the articles BANDAGE, BOLSTER, and SPLINT. In fractures of the lower arm, after you have applied your bandage and dreſſings, you may ſuſpend it in a ſcarf or ſling, which is to hang from the neck: in fractures of the leg, you may reſt the limb upon pillows, or in boxes, placing cuſhions or pillows under it: theſe machines are to be faſtened to the limb with tapes, that it may remain fixed and immoveable.

FRÆNUM, in anatomy, a term applied to ſome membranous ligaments of the body. As,

FRÆNUM LINGUÆ, the ligament under the tongue, which ſometimes ties it down too cloſe to the bottom of the mouth; and

and then requires to be incifed or divided, in order to give this organ its proper and free motion. This diforder generally arifes in infants foon after their birth, fo that they cannot move and exert their tongues in the action of fucking: though it is fometimes alfo obferved in adults. For the operation of cutting the frænum, fee the article TONGUE-TIED.

Each of the lips has alfo its peculiar frænum: the upper one under the nofe; the under one near the roots of the dentes incifores: thefe are of the utmoft fervice to us in fpeaking, and eating and drinking.

FRÆNUM PENIS, a ligament of the penis, that ties the prepuce to the lower part of the glans of the penis. See PENIS.

There is alfo a fmall frænum of the clitoris, by which it is connected to the offa pubis. See the article CLITORIS.

FRAGA, a town of Arragon, in Spain, fituated under the meridian of London: north lat. 41° 16'.

FRAGARIA, the STRAWBERRY, in botany, a genus of the *icofandria-pentagynia* clafs of plants, the corolla of which confifts of five roundifh, patent petals, inferted in the cup: there is no pericarpium; the common receptacle of the feed is of a roundifh, oval figure, plane at the bafe, pulpofe, large, foft, and deciduous; the feeds are numerous, fmall, acuminated, fcattered over the fuperficies of the receptacle, and not deciduous.

FRAIGHT, or FREIGHT, in commerce. See the article FREIGHT.

FRAIL, a bafket made of rufhes, or the like, in which are packed up figs, raifins, &c. It fignifies alfo a certain quantity of raifins, about 75 pounds.

FRAISE, in fortification, a kind of defence, confifting of pointed ftakes, fix or feven feet long, driven parallel to the horizon into the retrenchments of a camp, a half-moon, or the like, to prevent any approach or fcalade.

Fraifes differ from palifades chiefly in this, that the latter ftand perpendicular to the horizon, and the former jet out parallel to the horizon, or nearly fo, being ufually made a little floping, or with the points hanging down. Fraifes are chiefly ufed in retrenchments and other works thrown up of earth; fometimes they are found under the parapet of a rampart, ferving inftead of the cordon of ftone ufed in ftone-works.

To FRAISE *a battalion*, is to line the mufqueteers round with pikes, that, in cafe they fhould be charged with a body of horfe, the pikes being prefented, may cover the mufqueteers from the fhock of the horfe, and ferve as a barricade.

FRAME, in joinery, a kind of cafe, wherein a thing is fet or inclofed, or even fupported, as a window-frame, a picture-frame, &c.

FRAME is alfo a machine ufed in divers arts; as,

FRAME, among printers, is the ftand which fupports the cafes. See the article CASE.

FRAME, among founders, a kind of ledge inclofing a board, which, being filled with wetted fand, ferves as a mould to caft their works in. See FOUNDERY.

FRAME is more particularly ufed for a fort of loom, whereon artificers ftretch their linens, filks, ftuffs, &c. to be embroidered, quilted, or the like.

FRAME, among painters, a kind of fquare, confifting of four long flips of wood joined together, whofe intermediate fpace is divided by threads into feveral little fquares like a net; and hence fometimes called reticula. It ferves to reduce figures from great to fmall; or, on the contrary, to augment their fize from fmall to great.

FRAMING *of an houfe*, among carpenters, denotes all the timber work therein; namely, the carcafe, flooring, partitioning, roofing, ceiling, beams, afhlering, &c. all together. See FLOOR, &c.

FRAMPOLE-FENCES, a privilege enjoyed by the tenants of the manor of Writtel in Effex, whereby they are intitled to the wood growing on the fence, and as many poles as they can reach from the top of the ditch with an axe's helve, towards the repair of their fences.

FRANC, or FRANK. See FRANK.

FRANCE, a large kingdom of Europe, fituated between 5° weft and 7° eaft long. and between 43° and 51° north lat. being bounded by the englifh channel and the auftrian Netherlands, on the north; by Germany, Switzerland, Savoy, and Piedmont, in Italy, on the eaft; by the Mediterranean fea, and the Pyrenean mountains, which feparate it from Spain, on the fouth; and by the bay of Bifcay, on the weft. This kingdom was formerly divided into twelve provinces, but at prefent it is divided into twenty-five general governments, over every one of which is an officer, called an intendant, appointed by the king, who has a power of controuling the governor, and all other officers of juftice; and prefides over the receivers-general of his generality.

FRANC-

FRANCFORT, a city of Germany, ſituated on the confines of Heſſe and Franconia, on both ſides of the river Maine: eaſt longitude 7° 30′ north lat. 50° 10′.

FRANCFORT *on the Oder*, a city of Germany in the circle of upper Saxony, and marquiſate of Brandenburg, ſituated in eaſt long. 15°, north lat. 52° 22′.

FRANCHE-COMTE, the ſame with the county of Burgundy. See BURGUNDY.

FRANCHE-COMTE, a province of France bounded by Lorrain on the north; by Alſace and Switzerland, on the eaſt; by La Breſs and Bugey, on the ſouth; and by the dukedom of Burgundy, on the weſt.

FRANCHISE, in a general ſenſe, a privilege or exemption from ordinary juriſdiction; as that for a corporation to hold pleas among themſelves to ſuch a value, or the like.

FRANCHISE is ſometimes uſed for an immunity, from tribute, in which ſenſe it is either perſonal or real; that is, belonging to a perſon immediately, or elſe by means of this or that place of which he is chief, or a member.

A franchiſe may be veſted either in bodies politic, or corporations; in borough towns, or in any ſingle perſon. There are franchiſes of different kinds, as the principality of Wales, counties palatine, counties, hundreds, parts of the ſea, &c. Beſides which there is a franchiſe of having a leet, manor, or lordſhip; as alſo of fairs and markets, felon's goods; as alſo the goods of fugitives and outlaws; deodands, treaſure-trove, waifs, eſtrays, wrecks, &c. Franchiſes and liberties, being uſually held by charter, are all ſaid to be derived from the crown, but ſome lie in preſcription without the help of any charter.

FRANCHISE ROYAL ſeems to be that where the king's writ does not run; but Bracton ſays, that a franchiſe royal, is where the king grants to one and his heirs an exemption of toll, &c.

FRANCHISE is alſo uſed for an aſylum or ſanctuary, where people are ſecure of their perſons. See ASYLUM.

FRANCHISE *of quarters*, a certain place or diſtrict at Rome, wherein are the houſes of the embaſſadors of the princes of Europe; and where ſuch as retire cannot be arreſted or ſeized by the ſbirri or ſerjeants, nor proſecuted at law.

Several of the popes publiſhed their bulls and ordinances againſt the abuſe made of this privilege, which reſcued ſo conſiderable a part of the city, by the enlargement of theſe places, from their authority, and rendered them a retreat for the moſt abandoned perſons. At laſt Innocent XI. expreſsly refuſed to receive any more embaſſadors, but ſuch as would make a formal renunciation of the franchiſe of quarters.

FRANCIGENÆ, in our old law-books, an appellation given to foreigners in general.

FRANCISCAN MONKS, FRIARS MINOR, or GREY FRIARS, religious of the order of St. Francis, founded by him in the year 1209. See the article FRIAR.

The rule of the franciſcans, as eſtabliſhed by St. Francis himſelf, is briefly this: they are to live in common, to obſerve chaſtity, and to pay obedience to the pope and their ſuperiors.

Before they can be admitted into the order, they are obliged to ſell all they have, and give it to the poor; they are to perform a year's noviciate, and when admitted, never to quit the order upon any account. They are to faſt from the feaſt of All-ſaints, to the nativity. This order has produced four popes, forty-two cardinals, and an infinite number of patriarchs. The franciſcans had ſixty-three monaſteries in England, one of which was in the pariſh of St. Nicholas in London.

FRANCOLINI, a town of Italy, ſituated on the river Po, about nine miles north-eaſt of Ferrara.

FRANCONIA, a circle of the german empire, lying between Bohemia on the eaſt, and the electorate of Mentz on the weſt. Its capital is Nuremburg; and from this country the Franks, who conquered and gave name to the kingdom of France, are ſaid to have come.

FRANGIPANE, a kind of exquiſite perfume given to the leather of which gloves, &c. are made.

There is likewiſe a perfumed liquor of the ſame name, as alſo a ros ſolis.

FRANK, or FRANC, meaning literally free from charges and impoſitions, or exempt from public taxes, has various ſignifications in our ancient cuſtoms.

FRANK ALMOIGN, ſignifies a tenure by ſpiritual ſervice, where lands or tenements are held by an eccleſiaſtical corporation, ſole or aggregate, to them and their ſucceſſors, of ſome lord and his heirs, in free and perpetual alms.

This is an ancient tenure chiefly to be met with in grants to religious houses, colleges, *&c.* No person can have lands in frank almoign, unless it is by prescription, or on a grant made before the statutes of mortmain; so that the tenure may not be created at this day. Nevertheless the king is not restrained by the statutes, nor a subject licensed or dispensed with by him to make such a grant; and if an ecclesiastical person holds lands at a certain rent, *&c.* the lord may confirm his estate to hold to him and his successors in frank almoign.

FRANK CHACE, is defined to be a liberty of free chace, whereby persons that have lands within the compass of the same, are prohibited to cut down any wood, *&c.* out of the view of the forester.

FRANK FEE, signifies the same as holding lands and tenements in fee simple; that is, to any person and his heirs, and not by such service as is required by antient demesne, but is pleaded at common law. See the article FEE.

FRANK FERM, anciently signified lands changed in the nature of the fee by feoffment, *&c.* out of the knights service for other certain yearly services.

FRANK FOLD, is where the lord has the liberty of folding his tenants sheep within his manor. See the article FALDAGE.

FRANK LANGUAGE, or LINGUA FRANCA, a kind of jargon spoken on the Mediterranean, and particularly throughout the coasts and parts of the Levant, composed of italian, spanish, french, vulgar greek, and other languages.

FRANK LAW, a word applied to the free and common law of the land, or the benefit a person has by it.

He that for any offence loseth this frank law, incurs these inconveniencies, *viz.* He may not be permitted to serve on juries, nor used as an evidence to the truth; and if he has any thing to do in the king's court, he must not approach it in person, but appoint his attorney; his lands, goods, and chattels shall be seized into the king's hands; and his lands be estreated; his trees rooted up, and his body committed to custody.

FRANK MARRIAGE, is where a person, seized in fee of lands or tenements, has given them to another with his daughter, sister, or some woman otherwise of kin to him, in free marriage, by virtue of which the husband and wife have an estate in special tail, and shall hold the land of the donor, discharged of all services, except fealty, to the fifth degree.

FRANK PLEDGE, in our law, signifies a pledge of surety for the behaviour of freemen.

According to the antient custom of England, for the preservation of the public peace, every free-born man, at the age of fourteen, except religious persons, clerks, knights, and their eldest sons, was obliged to give security for his truth and behaviour towards the king and his subjects, or else be imprisoned. Accordingly, a certain number of neighbours became interchangeably bound for each other, to see each person of their pledge forth-coming at all times, or to answer for the offence of any one gone away; so that whenever any person offended, it was presently inquired in what pledge he was; and there the persons bound either produced the offender in thirty-one days, or made satisfaction for his offence.

FRANK SERVICE. See the article SERVICE.

FRANK TENEMENT, is said to be a possession of freehold lands or tenements. See FREEHOLD and TENEMENT.

FRANK, or FRANC, an ancient coin, either of gold or silver, struck and current in France. The value of the gold-frank was somewhat more than that of the gold crown; the silver-frank was a third of the gold one: this coin is long out of use, though the term is still retained as the name of a money of account; in which sense it is equivalent to the livre, or twenty sols.

FRANKENDAL, a city of Germany, in the palatinate of the Rhine, situated on the west side of the river Rhine, in east long. 8° 15′, north lat. 49° 30′.

FRANKENIA, SEA-HEATH, or SEA-CHICKWEED, a genus of the *decandria-monogynia* class of plants, the flower of which consists of five petals, with a plain limb: the fruit is an oval, unilocular capsule, covered by the cup, and containing a great many ovated very small seeds.

FRANKENSTEIN, a town of Germany, in the palatinate of the Rhine, and dutchy of Zuebrugged, situated twelve miles north-west of Landau.

FRANKER, a town of the United-provinces, in the province of west Friesland, nine miles west of Lewarden.

FRANKINCENSE, *olibanum*, in the materia medica. See OLIBANUM.

FRANKS, FRANKIS, or FRANQUIS, an appel-

appellation given by the Turks, and other nations of Afia, to all the people of the weftern parts of Europe, to which they give the name of Frankiftan.

FRANSTAT, or FRAUSTAT, a town of Silefia, fituated twenty-five miles north-eaft of Glogaw, fubject to PRUSSIA.

FRASCATI, or FRESCATI, a town of Italy, in the campania of Rome, thirteen miles eaft of that city, near which place is the tufculum of Cicero, called Grotto Ferrate.

FRATERCULA, in zoology, the name by which Gefner calls the arctic duck. See the article DUCK.

FRATERNITY, in the roman catholic countries, fignifies a fociety for the improvement of devotion.

Of thefe there are feveral forts; as, 1. The fraternity of the rofary, founded by St. Dominic: it is divided into two branches, called the common rofary, and the perpetual rofary; the former of whom are obliged to confefs and communicate every firft Sunday in the month, and the latter to repeat the rofary continually. See the article ROSARY.

2. The fraternity of the fcapulary, whom the bleffed virgin, according to the fabbatin bull of pope John XXII. has promifed to deliver out of hell the firft Sunday after their death. See SCAPULARY.

3. The fraternity of St. Francis's girdle, are cloathed with a fack of a grey colour, which they tie with a cord; and, in proceffions, walk bare-footed, carrying in their hands a wooden crofs.

4. That of St. Auftin's leathern girdle, comprehends a great many devotees.

Italy, Spain, and Portugal, are the countries where one fees the greateft number of thefe fraternities, fome of which affume the name of arch-fraternities. Pope Clement VII. inftituted the arch-fraternity of charity, which diftributes bread every Sunday among the poor, and gives portions to forty poor girls on the feaft of St. Jerom their patron. The fraternity of death, buries fuch dead as are abandoned by their relations, and caufes maffes to be celebrated for them. The fraternity of St. Mary of the fuffrage, employ their prayers to releafe fouls out of purgatory. The fraternity of mercy, at Lifbon, confifts of perfons of the greateft quality, the king himfelf being a member of it; the defign of its inftitution is to procure a great number of maffes to the faithful, but chiefly to its own members.

What has been faid, may fuffice to fhew the nature of thefe fraternities; by entering into which, moft of the devotees believe they are much furer of falvation, than they could otherwife be.

FRATERNITY, in a civil fenfe, a company or guild of certain artificers or traders. See the articles COMPANY and GUILD.

FRATRICELLI, LITTLE BROTHERS, in church hiftory, a fect of heretics who appeared in Italy about the year 1298, and afterwards fpread all over Europe. They wore the habit of the francifcan order, and pretended that ecclefiaftics ought to have no poffeffions of their own.

FRATRIAGE, *fratriagium*, the partition among brothers or coheirs, coming to the fame inheritance or fucceffion.

Fratriage more particularly fignifies a younger brother's inheritance; or whatever the younger fons poffefs of the father's eftate, which, in our antient law, they are faid to enjoy ratione fratriagii; and were to do homage for the fame to the elder brother, he being bound to do homage to the fuperior lord for the whole.

FRATRES ARVALES. See ARVALES.

FRATRES CONJURATI, in our antient law-books, *&c.* fignify fworn brothers, or thofe who took an oath to defend the king againft his enemies.

FRATRICIDE, the crime of murdering one's brother. See PARRICIDE.

FRAUD, in law, fignifies deceit in grants, or conveyances of lands, *&c.* or in bargains and fales of goods, *&c.* to the damage of another perfon.

A fraudulent conveyance of lands or goods to deceive creditors, as to creditors is void in law. And a fraudulent conveyance in order to defraud purchafers, is alfo to fuch purchafers void; and the perfons juftifying or putting off fuch grants as good, fhall forfeit a year's value of the lands, and the full value of the goods and chattels, and likewife fhall be imprifoned.

However, when conveyances are fraudulently made, they are not void to all perfons, but only to thofe that afterwards come to the land as purchafers on good confideration. A general gift made of all the goods of a perfon, may be reafonably fufpected to be by fraud, even though a true debt is owing to the party to whom made; and it is void againft other creditors of the donor. Here the feveral marks of fraud in a gift or grant of goods, are as follow, *viz.* 1. If it

be general, without any exception of ſome things of neceſſity. 2. If the donor continues to poſſeſs and uſe the goods. 3. If the deed be made in ſecret. 4. If there be a truſt between the parties; or, 5. If made whilſt the action is depending.

Where a perſon is party to a fraud, all that follows thereupon will be intended to be done by him, though fraud ſhall not be preſumed or adjudged to be ſo, until found by jury.

By the ſtatute of frauds, 29 Car. II. agreements for the ſale of lands, leaſes, &c. are required to be in writing. See 3 & 4 Will. and Mary, c. 14.

FRAUS LEGIS, is where the proceſs of the law is uſed with a felonious purpoſe; and a perſon is turned out of poſſeſſion of his houſe, by virtue of a writ of habere facias poſſeſſionem, on a falſe affidavit procured of the ſervice of a declaration in ejectment and judgment had thereon in fraudem legis.

FRAXINUS, the ASH, in botany, a genus of trees, belonging to the polygamia-dioecia claſs, in ſome ſpecies of which there is no corolla; in others there is a ſmall one, formed of four ſlender and acute petals: the fruit is ſingle, of a compreſſed lanceolate figure, and is what we commonly call the aſhen-key, ſeveral cluſters of which are affixed to the ſame common pedicle.

The wood of this tree is in great uſe among ſeveral artificers, as wheel-wrights, cart-wrights, carpenters, turners, &c. alſo for making ploughs, harrows, axle-trees, oars, balls, &c. It is ſaid to be as laſting for building as oak, and often preferred before it: though the timber of the trunk greatly excells that of a bough. Some aſh is alſo ſo curiouſly veined, that the cabinet-makers equal it to ebony, and call it green ebony; ſo that the woodmen, who light upon ſuch trees, may have for it what they will. The ſeaſon for felling this tree, is from November to February; for if cut down too early, or too late, it is liable to the worm. The aſh is hurtful to corn-lands, and therefore ſhould be planted either in hedges or clumps, at about nine or ten feet diſtance.

FRAY, among ſportſmen. A deer is ſaid to fray its head, when it rubs it againſt a tree, to cauſe the pills of the new horns to come off. See the article HEAD.

FREAM, a name given by farmers to plowed lands worn out of heart, and laid fallow till it recover. See FALLOWING.

FREAM, among ſportſmen, denotes the noiſe of a boar in rutting time.

FRECKLES, *lentigines*, ſpots of a yellowiſh colour, of the bigneſs of a lentile-ſeed, ſcattered over the face, neck, and hands. Freckles are either natural, or proceeding accidentally from the jaundice, or the action of the ſun upon the part. Heat, or a ſudden change of the weather, will often cauſe the ſkin to appear of a darker colour than natural, and thereby produce what is called tan, ſunburn, and morphew, which ſeem to differ only in degree; and uſually diſappear in winter. See the article TAN, &c.

Perſons of a fine complexion, and ſuch whoſe hair is red, are the moſt ſubject to freckles, eſpecially in thoſe parts which they expoſe to the air.

To remove freckles, put juice of lemons in a glaſs-vial, and mixing it with ſugar and borax, finely powdered, let it digeſt eight days, and then uſe it. Homberg propoſes bullock's gall, mixed with alum, and, after the alum has precipitated, expoſed three or four months to the ſun in a cloſe vial, as one of the beſt remedies known for the removing of freckles.

FREDENBERG, a town of Germany, in the circle of Weſtphalia, fifty miles weſt of Caſſel.

FREDERICA, a town of Georgia, in North America, ſituated in weſt long. 81° 30′, north lat. 31°, on the iſland of St. Simons, in the mouth of the river Alatamaha.

FREDERICKSBURG, a caſtle and palace of the king of Denmark, ſituated in the iſle of Zeland, twenty miles north-weſt of Copenhagen, built upon piles in the middle of a lake.

FREDERICKSBURG, a fort upon the gold coaſt of Guinea, near cape Three-points, ſubject to the Danes. It lies in weſt long. 2°, north lat. 5°.

FREDERICKSHALL, a ſtrong town of Norway, in the province of Agerhuys, ſituated on the frontiers of Sweden, thirty miles north of Frederickſtat.

FREDERICKSODE, a town of Jutland, in the province of Reypen, ſituated on the little belt in the Baltic-ſea, twenty miles weſt of Odenſee.

FREDERICKSTAT, a town of Sleſwick, or ſouth Jutland, ſituated on the river Eyder, near the german ocean, thirty-one miles weſt of Sleſwick.

FREDERICKSTAT, a town of Norway, in the principality of Agerhuys, ſituated on

a bay of the sea, called the Schaggerrack, near the frontiers of Sweden: east long. 11° 24', north lat. 59°.

FREE, in a general sense, is used in opposition to whatever is constrained or necessitated. When applied to things endowed with understanding, it more peculiarly relates to the liberty of the will. See the article FREEDOM.

FREE, among seamen. The pump is said to free the ship, when it throws out more water than leaks into her. To free the boat, is haling or lading out the water therein.

FREE-BENCH, signifies that estate in copyhold, which the wife, being espoused a virgin, has after the decease of her husband for her dower, according to the custom of the manor.

In regard to this free-bench, different manors have different customs, and in the manor of east and west Enbourne in the county of Berks, and in other parts of England, there is a custom, that when a copyhold tenant dies, the widow shall have her free-bench in all the deceased husband's lands, *dum sola & casta fuerit*, whilst she lives single and chaste; but if she is found to be guilty of incontinency, she shall forfeit her estate. Nevertheless, upon her coming into the court of the manor riding backwards on a black ram, with his tail in her hand, rehearsing a certain form of words, the steward is bound by custom to restore her to her free-bench.

FREE-BORD, ground claimed in some places beyond or without the fence, and said to contain two foot and an half.

FREE-CHAPEL, is properly a chapel of the king's foundation, and by him exempted from the ordinary's visitation or jurisdiction.

FREE, or IMPERIAL CITIES, in Germany, are those not subject to any particular prince, but governed, like republics, by their own magistrates. See CITY.

FREE-FAIR. } See the articles { FAIR.
FREE-FEE. } { FEE.

FREE HOLD, signifies lands or tenements which a person holds in fee-simple, fee-tail, or for term of life.

Freehold is distinguished into freehold in deed, and freehold in law: the first of which signifies the real possession of lands, &c. in fee, or for life; the other is the right that a person has to such lands or tenements before his entry.

FREE-HOLD is also extended to such offices as a man holds in fee, or during life. See the article FEE.

A freehold, by the common law, cannot commence in futuro, but it must take effect presently, either in possession, reversion, or remainder; and where a person pleads liberum tenementum, or freehold, generally the law intends he has an estate in fee, and not barely for life. Whatever is part of the freehold, goes to the heir; and things fixed thereto, may not be taken as a distress for rent, or in execution, &c. No person shall distrain freeholders to answer for their freehold, or any thing concerning the same, without the king's writ. By the antient laws of Scotland, freeholders are called milites, or knights.

FREE-MASON. See the article MASON.

FREE-PORT. See the article PORT.

FREE-STATE, a republic governed by magistrates elected by the free suffrages of the inhabitants.

FREE-STONE, a whitish stone dug up in many parts of England, that works like alabaster, but is more hard and durable; being of excellent use in building, &c. It is a kind of the grit-stone, but finer sanded, and a smoother stone, and is called free, from its being of such a constitution as to cut freely in any direction; such is the Portland-stone, and the free-stone of Kent.

FREE-STOOL. See FRID-STOLL.

FREE-THINKER. See the article DEISTS.

FREE-WARREN, the power of granting or denying licence to any one to hunt in such and such ground.

FREEDOM, in general, the state or quality of being free. See FREE.

FREEDOM *of a corporation*, the right of enjoying all the privileges and immunities belonging to it. See CORPORATION.

The freedom of cities, and other corporations, is regularly obtained by serving an apprenticeship; but it is also purchased with money, and sometimes conferred by way of compliment.

FREEDOM *of the will*, that power or faculty of the mind, whereby it is capable of acting or not acting, choosing or rejecting, whatever it judges proper. Of this every man must be sensible, who finds in himself a power to begin or forbear, continue or end several actions, barely by a thought or preference of the mind. The actual exercise of this power, is that which we call volition or willing; and the agent, capable of acting in

in this manner, is denominated free, and the actions he performs, voluntary. Whereas, on the other hand, wherever any performance or forbearance are not equally in a man's power; wherever doing or not doing will not equally follow upon the preference of his mind, there he is not free, though perhaps the action may be voluntary. To illustrate this, suppose a man to be carried whilst fast asleep into a room where is a person he longs to see, and be there locked fast in, beyond his power to get out; he awakes, and is glad to see himself in so desirable company, which he stays willingly in; that is, prefers his staying to going away. In this case, his stay is voluntary; and yet being locked fast in, he is not at liberty to stay, he has not freedom to be gone. So that liberty does not consist in the preference of the mind, but in the power of conforming to that preference.

FREEDOM *of contrariety*, among moralists, that of choosing either of two opposites, as virtue or vice, good or evil; concerning which the received doctrine is, that mankind have a freedom of contradiction, but not of contrariety; that is, they may abstain from the pursuit of virtue and good, but are incapable of hating them, or of preferring their opposites. See the article CONTRADICTION.

FREEDOM *of conscience*. See TOLERATION.

FREEZE, or FRIEZE, in architecture. See the article FRIEZE.

FREEZE, or FRIEZE, in commerce, a coarse kind of woollen stuff, or cloth, for winter-wear; so called as being freezed or napped on one side.

Irish frieze pays, on importation, a duty of $5\frac{1\frac{3}{4}}{100}$ d. for every yard; and draws back, on being exported, $4\frac{80}{100}$d. *per* yard.

FREEZING, in philosophy, the same with congelation. See the articles CONGELATION and FROST.

Philosophers are by no means agreed as to the cause of this phænomenon. The cartesians account for it by the recess or going out of the ethereal matter from the pores of the water. The corpuscularians, on the other hand, attribute it to the ingress of frigorific particles, as they call them; and Hobbes asserts, that these particles are nothing else but common air, which entangling itself with the particles of water, prevents their motion. Others will have a kind of nitrous salt to be the cause of congelation, by insinuating itself between the particles of water, and fixing them together like nails. And, indeed, it seems probable that cold and freezing do arise from some substance of a saline nature floating in the air; since all salts, and particularly nitrous ones, when mixed with ice and snow, greatly increase their cold, and even bulk.

Boerhaave observes, that it is extremely difficult to exhibit to the eye the precise degree of cold wherein ice begins to form; since heat and cold, once given to a body, adhere long to it before they quit it. When the air, therefore, is in such a state as keeps Fahrenheit's thermometer, at 32 degrees, water will not freeze; because water being 800 times denser than air, retains the warmth considerably longer than air. If any person therefore, is curious to know in what degree of cold water begins to freeze, let him first suspend a thermometer in a free open air on all sides; and then wetting a thin linen cloth with clear water, and hanging it likewise in the open air, it will grow stiff upon the first access of the freezing cold, and thereby shew when water is beginning to turn to ice. See the article THERMOMETER.

By means of freezing, wine, vinegar, and malt-liquors may be reduced to a fourth part of their quantity, without any considerable loss of their essential parts; since only the aqueous parts freeze, leaving the vinous parts concentrated or brought into less compass, and capable of being transported with less expence, and keeping for several years.

FREEZING MIXTURE. Mr. Boyle shews in his history of cold, that not only all kinds of salts, but likewise spirits, sugar, and saccharum saturni, mixed with snow, are capable of freezing most fluids; and the same effect was also produced by the mixture of oil of vitriol, or spirit of nitre, with snow.

FREEZING RAIN, that which falls in form of ice, or which freezes as soon as it reaches the ground.

FREIGHT, or FRAIGHT, in navigation and commerce, the hire of a ship, or a part thereof, for the conveyance and carriage of goods from one port or place to another; or the sum agreed on between the owner and the merchant, for the hire and use of a vessel.

The freight of a vessel is usually agreed on either at the rate of so much for the voyage, or by the month, or per ton.

Wherever

Wherever a ſhip freighted by the voyage, or by the month, is caſt away, plundered by pirates, or taken by the enemy, the freight becomes loſt; but if the merchant or any other who hires the ſhip, agrees by the tun, or after ſuch a rate for every piece of the commodities on board, and that part of the goods are ſaved, it is there held that the ſhip ought to have her freight, according to the rate of the goods ſaved. The lading of a ſhip, in law conſtruction, is bound for the freight; and where goods are put aboard, and the ſhip has broke ground, a merchant may not afterwards unlade them: for if he then changes his mind, and reſolves not to venture, by the marine law, freight is due. Likewiſe, if the freighter of a ſhip lade on board any prohibited goods, or unlawful merchandize, whereby the veſſel is detained or impeded in her voyage, he ſhall anſwer the freight agreed: but where a maſter freights out his ſhip, and afterwards takes in goods ſecretly and unknown to the firſt laders, he forfeits ſuch freight. In caſe any ſhip is freighted out and in, no freight will be due till the voyage is performed; and here if a veſſel be loſt in coming home, the freight outwards and inwards are both loſt.

If a whole veſſel be hired, and the merchant or perſon who hires it do not give it full load or burden, the maſter of the veſſel cannot, without his conſent, take in any other goods without accounting to him for freight. Though the merchant do not load the quantity of goods agreed on in the charter-party, yet he ſhall pay the whole freight; and if he load more, he ſhall pay for the exceſs. See the article CHARTER-PARTY.

The maſter may ſet aſhore ſuch goods as he finds in his veſſel, which were not notified to him; or take them at a higher rate than was agreed on for the reſt. If a ſhip be ſtopped or detained in its courſe, either through the merchant's or the maſter's fault, the delinquent ſhall be accountable to the other. If the maſter be obliged to refit his veſſel during the voyage, the merchant ſhall wait, or elſe pay the whole freight: if the veſſel could not be refitted, the maſter is obliged to hire another immediately, otherwiſe only to be paid his freight in proportion to the part of the voyage he performed: tho' in caſe the merchant prove that the veſſel, at the time it ſet ſail, was not capable of the voyage, the maſter muſt loſe his freight, and account for damages to the merchant.

Freight ſhall be paid for merchandizes which the maſter was obliged to ſell for victuals, refitting, or other neceſſary occaſions, paying for the goods at the rate the reſt were ſold at where they were landed. In caſe of a prohibition of commerce with the country whither the veſſel is bound, ſo that it is obliged to be brought back again, the maſter ſhall only be paid freight for going. And if a ſhip be ſtopped or detained in its voyage by an embargo, by order of the prince, there ſhall neither be any freight paid for the time of detention, in caſe it be hired *per* month, nor ſhall the freight be increaſed, if hired by the voyage: but the pay and victuals of the ſailors, during the detention, ſhall be deemed average. See the article AVERAGE.

FREIGHT is alſo uſed for the burden or lading of a ſhip, or the cargo of goods, *&c.* which ſhe has on board.

FREIGHT alſo ſignifies a duty of fifty ſols *per* ton paid to the crown of France by the maſters of foreign veſſels going in or out of the ſeveral ports of the kingdom. It is to be obſerved, that all veſſels not built in France, are accounted foreign, though belonging to the king's ſubjects; and, as ſuch, are liable to the payment of this impoſt, unleſs otherwiſe exempted, or that two thirds of the crew are French. The Dutch and the hans towns are exempted from the duty of freight.

FRENCH, in general, ſomething belonging to France: thus we ſay, the french language, french cuſtoms, polity, *&c.* The french language is made up of latin, greek, teutonic, and the language ſpoken by the old Gauls. It is natural, and eaſily pronounced, and therefore uſed by moſt nations of Europe in converſing with foreigners. There are very few compound words in french, which is acknowledged to be to its diſadvantage. It has alſo few diminutives; but as to purity, eaſineſs, and flexibility, it yields to none.

FRENCH BREAD.	See	BREAD.
FRENCH COINS.	See	COIN.
FRENCH CROWN.	See	CROWN.
FRENCH WEIGHT, *&c.*	See	WEIGHT.

FRENUM, or FRÆNUM, in anatomy. See the article FRÆNUM.

FRENZY, PHRENZY, or PHRENSY, in medicine. See the article PHRENSY.

FRESCO, a method of painting in relievo on walls, fo as to endure the weather.

It is performed with water-colours on frefh plafter; and on a wall laid with mortar not yet dry. This fort of painting has a great advantage by its incorporating with the mortar, and, drying along with it, becomes very durable.

The compoft fhould be made of rubbifh ftones mixt with well-burnt flint, or lime, and water: but the faltnefs of the lime muft be wafhed out, by pouring water frequently on it. But this fhould not be done in moift weather.

To prevent the plafter from peeling, ftrike into the joints of the wall ftumps of horfe-nails fix inches diftant from each other. Firft plafter the walls pretty thick; then let it dry for fome time, the defigns and colours being firft ready prepared. This painting is chiefly performed on walls and vaults newly plaftered with lime and fand; and the plafter is only to be put on in proportion as the painting proceeds.

Plafter the wall a fecond time, about the thicknefs of half a crown, only fo much as you intend to work upon; and while it is wet, work the colours therein, which will incorporate with the plafter fo as never to wafh out.

The painting muft be worked with a free hand, and your colours made high enough at firft, as there can be no alteration made after the firft painting.

In this work fcarce any thing elfe is ufed but earths, which ftill retain their colour, defending it from the burning and falt of the lime. The colours are white, made of lime flacked fome time, and white marble duft, red and yellow oker, violet red, verditer, lapis lazuli, fmalt, black fpanifh brown, fpanifh white, &c. all which are ground and worked up with water.

The brufhes and pencils for this work muft be long and foft, or elfe they will rake and raze the painting: the colours muft be full and flowing from the brufh, and the defign or cartoon muft be perfect in the paper copy.

The antients painted on ftucco; and we may remark in Vitruvius what infinite care they took in making the incruftations or plaftering of their buildings, to render them beautiful and lafting; tho' the modern painters find a plafter made of lime and fand preferable thereto.

FRESH, in general, fomething that is new, pure, and good; or, that has little or no falt in it.

FRESH DISSEISIN, in law, fuch a diffeifin as a man may defeat of himfelf, and by his own power, without the affiftance of the king or the law; as where it is of fhort continuance, *viz.* not above fifteen days. See the article DISSEISIN.

FRESH FINE, a fine that was levied within a year paft. See the article FINE.

FRESH FORCE, fignifies a force newly done; as where a perfon is diffeifed of any lands or tenements within a city or borough, or deforced of lands after the deceafe of his anceftor, to whom he is heir; the perfon having right may within forty days after the force committed, or title to him accrued, bring his affife or bill of frefh force, and recover the lands. See the article FORCE.

FRESH HAWSE, among feamen. See the article HAWSE.

FRESH SHOT, in the fea-language, fignifies the falling down of any great river into the fea, by means whereof the fea hath frefh water a good way from the mouth of the river. As this is more or lefs, they call it a great or fmall frefh fhot.

FRESH SPELL, in the fea-phrafe, a frefh gang to relieve the rowers in the long-boat.

FRESH SUIT, in law, is fuch a clofe and active profecution of an offender, as never ceafes from the time of the offence committed or difcovered, till he is apprehended.

The benefit and effect of this purfuit of a felon is, that the party purfuing fhall have his goods again, which otherwife would be forfeited to the king. A perfon may be faid to make a frefh fuit tho' he does not take the thief prefently, but fome time after the robbery is committed, provided he has ufed his utmoft endeavours to take him; and though the criminal was taken by another perfon not interefted in any thing carried away, yet the party robbed fhall be deemed to have made a frefh fuit.

FRESH WATER. See the article WATER.

FRET, or FRETTE, in architecture, a kind of knot or ornament, confifting of two lifts or fmall fillets varioufly interlaced or interwoven, and running at parallel diftances equal to their breadth. See plate CVI. fig. 3.

Every return and interfection of thefe frets muft be at right angles, otherwife they lofe all their beauty, and become perfectly gothic. Sometimes the fret confifts but of a fingle fillet, which, if well

difpofed,

difpofed, may be made to fill its fpace exceedingly well. Frets were very much ufed by the antients, efpecially on even flat members, or parts of a building, as the faces of the corona, and eves of corniches; under the roofs, foffits, &c. and on the plinths of bafes, &c.

FRET, in heraldry, a bearing compofed of fix bars, croffed, and varioufly interlaced, as reprefented in plate CVII. fig. 2. Some call it the true-lover's knot.

FRET, in mufic, fignifies a kind of ftop on fome inftruments, particularly bafs-viols and lutes. Frets confift of ftrings tied round the neck of the inftrument, at certain diftances, within which fuch and fuch notes are to be found.

FRET-WORK, that adorned with frets. It is fometimes ufed to fill up and enrich flat empty fpaces; but is moftly practifed in roofs, which are fretted over with plafter-work. The Italians alfo ufe fret-works in the mantling of chimneys, with great figures: a cheap piece of magnificence, and as durable almoft within doors, as harder matters in the weather.

FRETTY, in heraldry, an appellation given to bearings made up of fix, eight, or more bars laid acrofs each other, in the manner of frets. See FRET.

FREYSTAT, a town of Silefia, in Germany, eaft long. 17° 55′, north lat. 50°.

FRIABLE, among naturalifts, an appellation given to bodies that are eafily crumbled to pieces: fuch are the free-ftone, pumice-ftone, &c.

FRIAR, or FRIER, from the French *frere*, a brother, a term common to monks of all orders, founded on this, that there is a kind of fraternity, or brotherhood, between the feveral religious perfons of the fame convent or monaftery.

Friars are generally diftinguifhed into thefe four principal branches, *viz.* 1. Minors, grey friars, or francifcans. 2. Auguftines. 3. Dominicans, or black friars. 4. White friars, or carmelites. From thefe four the reft of the orders defcend. See the articles FRANCISCAN, AUGUSTINES, &c.

FRIAR, in its more peculiar and proper fenfe, is reftrained to fuch monks as are not priefts, for thofe in orders are generally dignified with the title of father.

FRIAR OBSERVANT, is a branch of the francifcan friars; thus called, becaufe they are not combined together in any cloifter, convent or corporation, as the conventuals are; but have bound themfelves only to obferve the rules of their order more ftrictly than the conventuals do, from whom they feparated, out of a fingularity of zeal, living in certain places of their own choofing.

FRIAR'S COUL, in botany, a name given to feveral fpecies of arum. See the article ARUM.

FRIBURG, the capital of a canton of the fame name in Switzerland, fituated eighteen miles fouth-weft of Bern: eaft long. 6° 55′, north lat. 46° 50′.

FRIBURGH, a city of Swabia, in Germany, twenty-eight miles fouth of Strafburg.

FRIBURGH, or FRIDBURGH, in our old cuftoms, the fame with frank pledge. See the article FRANK.

FRICASSEE, in cookery, a difh haftily dreffed in a frying-pan, with butter, oil, or the like. Thus we fay, a fricaffee of pullets, tripe, eggs, &c.

FRICENTO, a town and bifhop's fee of Italy, forty-three miles eaft of the city of Naples.

FRICTION, in mechanics, the rubbing of the parts of engines and machines againft each other, by which means a great part of their effect is deftroyed.

It is hardly poffible to lay down general rules concerning the quantity of friction; fince it depends upon a multiplicity of circumftances, as the ftructure, firmnefs, elafticity, &c. of the bodies rubbing againft each other. Some authors make friction, upon an horizontal plane, equal to one third of the weight to be moved; whilft others have found it to be confiderably lefs.

Be this as it will, the doctrine of friction as afcertained by the lateft experiments, may be fummed up in the following manner. 1. When one body infifts on another upon a horizontal plane, it preffes it with its whole weight; which being equally re-acted on, and confequently the whole effect of its gravity deftroyed by the plane, it will be abfolutely free to move in any horizontal direction by any the leaft power applied thereto, provided both the touching furfaces be perfectly fmooth. 2. But fince we find no fuch thing as perfect fmoothnefs in the furfaces of bodies, but an evident roughnefs or unevennefs of the parts in their furface, arifing from their porofity and peculiar texture, it is eafy to underftand that when two fuch furfaces come together, the prominent parts of one will, in fome meafure, fall into the concave parts of the other; and, therefore, when an horizontal motion

tion is attempted in one, the fixed prominent parts of the other will give more or leſs reſiſtance to the moving ſurface, by holding and detaining its parts; and this is what we call friction. 3. Now ſince any body will require a force proportional to its weight to draw it over a given obſtacle, it follows that the friction ariſing to the moving body will always be in proportion to its weight only, and not the quantity of the ſurface, by which it bears upon the reſiſting plane or ſurface. Thus if a piece of wood four inches wide, and one thick, be laid upon another fixed piece of the ſame wood, it will require the ſame weight to draw it along, whether it be laid on its broad or narrow ſide. 4. For tho' there be four times the number of touching particles on the broad ſide (cæteris paribus) yet each particle is preſſed with but $\frac{1}{4}$ of the weight that thoſe are on the narrow ſide; and ſince four times the number, multiplied by $\frac{1}{4}$ of the weight, is equal to $\frac{1}{4}$ of the number multiplied by four times the weight, it is plain the reſiſtance is equal in both caſes, and ſo requires the ſame force to overcome it. 5. The reaſon why friction is proportional to the weight of the moving body, is, becauſe the power applied to move the body, muſt raiſe it over the prominent parts of the ſurface on which it is drawn; and this motion of the body, as it is not upright, ſo it will not require a power equal to its whole weight; but being in the nature of the motion on an inclined plane, it will require only a part of its own weight, which will vary with the various degrees of ſmoothneſs and aſperity. 6. It is found by experiment, that a body will be drawn along by nearly one third of its weight; and if the ſurface be hard and well poliſhed, by leſs than a third part; whereas, if the parts be ſoft or rugged, it will require a much greater weight. Thus alſo the cylinder of wood A B, (plate CVII. fig. 3. n° 1.) if very ſmooth, and laid on two well poliſhed ſupporters, C, D, (having been firſt oiled or greaſed) and then charged with the weight of two pounds in the two equal balls, G, H, it will require an additional weight *x*, equal to about a third part of the two pounds, to give motion to, or overcome the friction of the ſaid cylinder. 7. Now this additional weight, as it cauſes a greater weight of the cylinder, will likewiſe encreaſe the friction, and therefore require the addition of another weight *y*, equal to the third part of its own weight: for the ſame reaſon, the weight *y* will require another *z*, a third part leſs; and ſo on, *ad infinitum*. Hence, ſuppoſing the friction to be preciſely a third of the weight, the firſt weight with all the additional ones, *viz.* 2, $\frac{2}{3}$, $\frac{2}{9}$, $\frac{2}{27}$, &c. will be a ſeries of numbers in geometrical progreſſion, decreaſing. Now the ſum of all theſe terms, except the firſt, is found, by a well known theorem in arithmetic, to be equal to one pound. So that if the weight of the cylinder be inconſiderable, the readieſt way to overcome the friction, would be to double the power G, or H, at once. 8. But tho' we may, at a medium, allow a third part of the weight with which any ſimple machine is charged, for the friction ariſing from thence; yet this is very precarious, and ſeldom is the caſe: for if A B C D (*ibid.* n° 2.) be a piece of braſs of ſix ounces, and E F G H be alſo a plate of braſs, and both the ſurfaces well ground and poliſhed, the weight P of near two ounces will be required to draw along the body A C alone; but if A C be loaded with 6, 8, or 10 ℔. then a ſixth part of the weight will be ſufficient to draw it along the plane. On the other hand, if the plane be covered with a linen or woollen cloth, then a third, or half part, and ſometimes more, will be requiſite to draw it along on the plane. 9. Yet notwithſtanding the difficulty and uncertainty attending the eſtimation of the quantity of friction, it is ſtill a moſt uſeful and neceſſary enquiry, how, and by what means the friction of any machine may be diminiſhed. In order to this, we muſt conſider friction mechanically, or as a force acting againſt a power applied to overcome it. Thus ſuppoſe A B (*ibid.* n° 3.) an upright ſtem or ſhaft, turning freely in the ſocket B fixed in the table or plane I K L M; and A C, D E, two arms fixed in the ſaid ſhaft, the latter of which, D E, has three pins going into a ſocket in the middle of heavy weights, F, G, or H, in ſuch a manner, that when a power applied at C moves the lever A C, it cauſes the lever D E to protrude or thruſt along the weights at F, G, or H, in a circular manner upon the table. 10. Now ſince we ſuppoſe the weight, all the while it is in motion, is freely and wholly ſupported by the plane, it follows that all the reſiſtance it can give to the power applied at C, is only what ariſes from its friction on the plane. What this friction is, will

will be found by applying the weight at G, fo that B G be equal to A C ; for then the power applied to C, acting in a tangent to the circle C R S, that fhall juft move the weight G, will be equal to its friction. But if the weight be applied at F, becaufe B F is greater than A C, the fame power at C, as before, will not move it, by reafon its force is here increafed by having a greater velocity than the power ; as, on the other hand, if placed at H, a lefs power at C fhall move it, becaufe of its having there lefs velocity than the power, as is evident from the properties of the lever. 11. Hence we underftand, that though the weight of a machine remains the fame ; yet the friction may be diminifhed, by contriving that the parts, on which it moves and rubs, fhall have lefs velocity than the power which moves it : thus, if the cylinder A B *(ibid.* n° 1.) were to move on the two fmall pins or gudgeons E, F, the friction would be abated in the proportion of the diameter of the cylinder to that of the pins. 12. The friction on thefe gudgeons is ftill farther diminifhed by caufing them to move on the circumference of a wheel : thus, let F be the gudgeon of a cylinder, revolving on the wheel C D E *(ibid.* n° 4.) the velocity of the wheel's circumference will be the fame with that of the gudgeon ; but the velocity of the wheel's axis A B (which is now to be confidered as the rubbing part) is lefs than that of the wheel, in proportion as its diameter is lefs than that of the wheel : for example, if the friction of the cylinder moving on its furface, be $\frac{1}{3}$ part of the weight, and the gudgeon be to the cylinder as 1 : 10, they will reduce the friction to $\frac{1}{30}$ part ; and if, again, the axis of the wheel be to the wheel as 1 : 10, the wheel will reduce the friction to $\frac{1}{300}$ part; and if the axis of this wheel be laid on the perimeter of another wheel, the friction will be reduced to a ftill leffer part of the weight ; fo that you may proceed in this manner to diminifh the friction *ad infinitum* ; and wheels applied in this manner, are called friction wheels. 13. Befides what has been already faid, fomewhat farther is neceffary to diminifh the friction of wheel-carriages. It was before obferved, that friction arofe chiefly by lifting the body over the prominent parts of the plane on which it is moved ; now if we can contrive to move the body along without lifting or fuftaining its weight, we fhall move it without much friction ; and this may be done by laying the body on any moveable circular fubject, as rollers, wheels, *&c.* thus let A B *(ibid.* n° 5.) be the fection of an heavy body, laid on a roller E F, upon the plane C D, and drawn by the power P ; it is evident, when A B moves, the afperities of its furface will lay hold on thofe of the roller, and move it likewife ; and it is as evident that when the body A B is drawn againft the prominent parts of the roller, they immediately give way, and make no refiftance : thus the perpendicular diameter *a b* yields into the fituation *e f*, and *c d* fucceeds in its place. By this circular motion of the roller, its prominent parts below do only defcend and move upon or over, and are not drawn againft the fixed prominent parts of the plane and fo receive no refiftance from them. Hence the body A B is conveyed along, without being lifted up, in the fame manner as a wheel is moved by a pinion, without any confiderable refiftance. And this is the true foundation of the doctrine of wheel-carriages. See the article WHEEL-CARRIAGES.

FRICTION, in medicine, the rubbing a difeafed part, either with or without unguents, oils, *&c.* Dr. Cheyne greatly recommends friction with a flefh-brufh, to perfons of weak nerves and fedentary lives ; by which means a full and free perfpiration would be promoted, and obftructions removed, to the great relief of many valetudinarians.

FRIDAY, the fixth day of the week, fo called from Friga, a goddefs worfhipped by the Saxons on this day.

Every Friday throughout the year, in the church of England, is a faft, (except Chriftmas-day, which, even though it happen on a Friday, is always a feftival,) in compliance with the cuftom of the primitive church, which always obferved this as a faft, in commemoration of our Saviour's crucifixion. It was one of their ftationary days, when they ufually forbore eating till three o'clock in the afternoon.

Good-FRIDAY, a faft of the chriftian church, in memory of the fufferings and death of Jefus Chrift, obferved on the holy, or paffion-week, and called good, by way of eminence, becaufe of the bleffed effects of our Saviour's fufferings, which were a propitiatory and expiating facrifice for the fins of the world. See the article PASSION-WEEK.

On

On Good-Friday the pope ſits on a plain form, and after ſervice is ended, when the cardinals wait on him back to his chamber, they are obliged to keep a deep ſilence as a teſtimony of their ſorrow. In the night of Good Friday, the Greeks perform the obſequies of our Saviour round a great crucifix laid on a bed of ſtate adorned with flowers; theſe the biſhops diſtribute among the aſſiſtants, when the office is ended. The Armenians, on this day, ſet open a holy ſepulchre, in imitation of that on mount Calvary.

FRIDBURG, an imperial city of Bavaria, in Germany: eaſt longitude 11°, and north lat. 48° 30′.

FRIDBURG is alſo the name of two other towns in Germany, both ſituated in the circle of Upper Saxony, the one nine miles ſouth-weſt of Dreſden, and the other thirty miles weſt of Leipſic.

FRIDLAND, a town of Bohemia, on the confines of Luſatia: eaſt long. 15° 5′, and north lat. 50°, 55′.

FRIDLINGEN, a town of Swabia, in Germany: eaſt long. 7° 30′, and north lat. 47° 35′.

FRIDSTOL, mentioned in our antient writers, among the immunities granted to churches, ſignifies a ſeat, chair, or place of peace and ſecurity, where criminals might find ſafety and protection: of theſe there were many in England, but the moſt famous was at Beverley, and that in St. Peter's church at York, granted by charter of king Henry I.

FRIEDBURG, an imperial city of Germany, ſixteen miles north of Francfort on the Main.

FRIENDLESS MAN, an old Saxon term for an outlaw.

FRIER, or FRIAR. See FRIAR.

FRIESLAND, one of the moſt northern provinces of the United Netherlands, bounded by the German ocean on the north, by Groningen and Overyſſel on the eaſt, by the Zuider-ſea and Overyſſel on the ſouth, and by the ſame ocean on the weſt: Its chief town is Lewarden.

Eaſt-FRIESLAND, a province of Weſtphalia, in Germany, being the north weſt part of Germany, bordering on Groningen.

FRIEZE, FREEZE, or FRIZE, in architecture, a large flat face, or member, ſeparating the architrave from the corniche, being that part of the entablature between the architrave and corniche. See the articles ARCHITRAVE, CORNICHE, and ENTABLATURE.

This member was by the antients called zoophorus, becauſe it was commonly enriched with the figures of animals. The frieze is ſuppoſed to be deſigned to repreſent the heads of the tranſverſe beams, which ſuſtain the roof or covering.

In the tuſcan order it is quite plain, but is enriched with triglyphs in the doric; it is ſometimes made arched or ſwelling in the ionic: in the corinthian and compoſite it is frequently joined to the architrave by a little ſweep, and ſometimes to the corniche; and in theſe richer orders, it is commonly adorned with ſculpture, figures, compartments, hiſtories, foliages, feſtoons, &c. See the articles TUSCAN, DORIC, IONIC, &c.

As to the height of the frieze, it is in general much the ſame as that of the architrave. The height of the tuſcan frieze, according to Vitruvius, who makes it flat and plain, is 30 minutes; but Palladio, who makes it convex and ſwelling, gives it only 26; Scamozzi makes it plain, but raiſes the height to 42 minutes. Vitruvius and Vignola, who make the doric frieze flat, only covered with triglyphs give it the height of 30 or 40 minutes: but Palladio and Scamozzi make it 45. The ionic frieze, according to Vitruvius, who makes it flat, only carved with acanthus-leaves, &c. is 30 minutes in height; Vignola makes it 45, and flat like Vitruvius: Palladio, who makes it convex and ſwelling, calls the height 27; and Scamozzi 28. The height of the corinthian frieze, according to Vitruvius, who enriches it with acanthus-leaves; human figures, &c. is 37 minutes; but Vignola makes it 45; Palladio, 28; and Scamozzi 31½. Laſtly, the compoſite frieze, which, in Vitruvius, is ſet with cartouſes, and carved between them, is, according to that writer, 52½ minutes high; but Vignola, who makes it like Vitruvius, gives it but 45 minutes; Palladio, who makes it ſwelling, has but 30; Scamozzi, 32.

From the variety of their ornaments, friezes obtain various denominations.

Convex or *Pulvinated* FRIEZES, ſuch whoſe profile is a curve, the beſt proportion of which is when drawn on the baſe of an equilateral triangle.

In ſome the ſwelling is only at top, as in a conſole; in others at bottom, as in a balluſter. See the articles CONSOLE and BALLUSTER.

Flouriſhed FRIEZES, ſuch as are enriched with rinds of imaginary foliages, as the

corinthian frieze of the frontifpiece of Nero: or with natural leaves, either in clufters or garlands; or continued, as in the ionic of the gallery of Apollo in the Louvre.

Hiftorical FRIEZES, fuch as are adorned with bafs relievos, reprefenting hiftory, facrifices, *&c.* as the arch of Titus at Rome.

Marine FRIEZES, fuch as reprefent fea-horfes, tritons, and other attributes of the fea, as fhells, baths, grottos, *&c.*

Ruftic FRIEZES, fuch whofe courfes are rufticated or emboffed, as in the tufcan frieze of Palladio.

Symbolical FRIEZES, thofe adorned with the attributes of religion, as the corinthian of the temple behind the Capitol at Rome, whereon are reprefented the inftruments and apparatus of facrifice.

FRIEZE *of the capital.* See the article HYPOTRACHELION.

FRIEZE, or FREEZE, in commerce. See FREEZE and FRIZING.

FRIGAT, among feamen, a fhip of war, light built, and that is a good failer.

A frigat has commonly two decks, whence that called a light frigat, is a frigat with only one deck.

FRIGATOON, a venetian veffel, commonly ufed in the Adriatic fea, with a fquare ftern, and carrying only a main-maft, mizen, and bowfprit.

FRIGID is applied to a jejune ftyle, that is unanimated by any ornaments, and confequently without any force or vigour.

FRIGID ZONE, in geography. See the article ZONE.

FRIGORIFIC, in phyfiology, fmall particles of matter, which, according to Gaffendus and others, being actually and effentially cold, and penetrating other bodies, produce in them that quality which we call cold. See COLD.

FRILL, in falconry. When a hawk trembles, or fhivers, they fay, fhe frills.

FRINGILLA, in ornithology, a comprehenfive genus of birds, of the order of the pafferes, with the beak of a conic fharp-pointed figure, the two chaps of which mutually receive each other.

To this genus belong the gold-finch, chaff-finch, green-finch, yellow-hammer, canary-bird, linnet, fparrow, *&c.* See the articles GOLD-FINCH, *&c.*

FRINGILLAGO, a name given by fome authors to the parus or titmoufe. See the article TITMOUSE.

FRINGILLARIUS, ACCIPITER, the name by which authors call the fparrow-hawk. See the article HAWK.

FRINWALT, or FRIDLAND, a town of Brandenburg, thirty miles north-eaft of Berlin, fituated on the weft-fide of the river Oder.

FRIO, a cape or promontory of Brafil: weft longitude 44°, and fouth latitude 23° 30′.

FRIPPERY, a french term fometimes ufed in our language to fignify the trade or traffic of old fecond-hand cloaths and goods. The word is alfo ufed for the place where fuch fort of commerce is carried on, and even for the commodities themfelves. The company of frippiers, or fripperers, at Paris, are a regular corporation, of an antient ftanding, and make a confiderable figure in that city.

FRISACH, a town of Bavaria, fixty miles fouth-eaft of Saltzburg: eaft long. 14° 15′, and north lat. 47° 20′.

FRISELAND, or FRIESLAND. See the article FRIESLAND.

FRISONE, in ornithology, the fame with the coccothrauftes, or loxia. See the article LOXIA.

FRIST in the mercantile ftyle, fignifies felling goods upon credit, or truft.

FRIT, in the glafs-manufacture, the matter or ingredients whereof glafs is to be made, when they have been calcined or baked in a furnace; or it is the calcined matter to be run into glafs. See the article GLASS.

There are three kinds of frit; the firft, that made for cryftal; the fecond, or ordinary frit, is that made for the common white or cryftalline metal; and the third, that made for green-glafs.

The frit for cryftal is made as follows: take 200 ℔ of tarfo, powdered fine, and fifted; of the falt of polverine 130 ℔; mix them well together, and put them into the calcar, a fort of oven, or reverberatory furnace, which fhould be firft well heated: here let them remain, baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate. The fecond, or ordinary frit, is made of bare afhes of polverine, without extracting the falt from them. The third, for green glafs, is made of common afhes, without any preparation.

It may be obferved, that glafs might be made by immediately melting the materials,

rials, without this calcining and making them into frit; but the operation would be much more tedious.

FRITH, in its moſt uſual acceptation, ſignifies an arm of the ſea: ſuch are the frith of Forth or of Edinburgh, the frith of Clyde, Murray frith, &c.

FRITH, among lawyers, ſignifies a lawn or plain between two woods.

FRITH-GILD, a term antiently uſed for what is now called a guild-hall, or a company of ſome corporation: and frithman was one free of ſuch company. See GUILDHALL and COMPANY.

FRITH is alſo uſed to ſignify peace. Hence

FRITH SOKE, or FRITH-SOKEN, a term formerly uſed to ſignify a ſurety of defence.

FRITILLARIA, fritillary, in botany. See the next article.

FRITILLARY, *fritillaria*, in botany, a genus of the hexandria monogynia claſs of plants, the corolla of which is compoſed of ſix companulated, oblong, and parallel petals, with a broad baſe; the fruit is an oblong, obtuſe, trilobate capſule, formed of three valves, and containing three cells; the ſeeds are numerous, plane, ſemiorbiculated externally, and placed in a double row.

Thick FRITILLARY, *fritillaria craſſa*, in botany, the ſame with the aſclepias. See the article ASCLEPIAS.

FRIULI, a province of Italy, ſubject to Venice, and bounded by Carinthia in Germany on the north, by Carniola on the eaſt, by the gulph of Venice on the ſouth, and by the Belluneſe and Feltrin on the weſt.

FRIZE, or FRIEZE, in architecture. See the article FRIEZE.

FRIZE, or FREEZE, in commerce. See the article FREEZE.

FRIZING *of cloth*, a term, in the woollen manufactory, applied to the forming of the nap of a cloth, or ſtuff, into a number of little hard burrs or prominences, covering almoſt the whole ground thereof. See the article FREEZE.

Some cloths are only freezed on the backſide, as black cloths; others on the right ſide, as coloured and mixed cloths, rateens, bays freezes, &c.

Frizing may be performed two ways; one with the hand, that is, by means of two workmen, who conduct a kind of plank that ſerves for a frizing inſtrument.

The other way is by a mill, worked either by water, or a horſe, or ſometimes by men. This latter is eſteemed the better way of frizing, by reaſon the motion being uniform and regular, the little knobs of the frizing are formed more equably and regularly. The ſtructure of this uſeful machine is as follows.

The three principal parts are the frizer or criſper, the frizing-table, and the drawer, or beam. The two firſt are two equal planks or boards, each about ten feet long, and fifteen inches broad, differing only in this, that the frizing-table is lined or covered with a kind of coarſe woollen ſtuff, of a rough ſturdy nap; and the frizer is incruſtated with a kind of cement compoſed of glue, gum arabic, and a yellow ſand, with a little aqua vitæ or urine. The beam, or drawer, thus called becauſe it draws the ſtuff from between the frizer and the frizing-table, is a wooden roller, beſet all over with little, fine, ſhort points, or ends of wire, like thoſe of cards uſed in carding of wool.

The diſpoſition and uſe of the machine is thus: the table ſtands immoveable, and bears or ſuſtains the cloth to be frized, which is laid with that ſide uppermoſt on which the nap is to be raiſed: over the table is placed the frizer, at ſuch a diſtance from it as to give room for the ſtuff to be paſſed between them, ſo that the frizer, having a very ſlow ſemicircular motion, meeting the long hairs or naps of the cloth, twiſts and rolls them into little knobs or burrs, while, at the ſame time, the drawer, which is continually turning, draws away the ſtuff from under the frizer, and winds it over its own points.

All that the workman has to do while the machine is a going, is to ſtretch the ſtuff on the table, as faſt as the drawer takes it off; and from time to time to take off the ſtuff from the points of the drawer. The deſign of having the frizing-table lined with ſtuff of a ſhort, ſtiff, ſtubby nap, is that it may detain the cloth between the table and the frizer long enough for the grain to be formed, that the drawer may not take it away too readily, which muſt otherwiſe be the caſe, as it is not held by any thing at the other end. It were unneceſſary to ſay any thing particular of the manner of frizing ſtuffs with the hand, it being the aim of the workmen to imitate, as near as they can, with

with their wooden inftrument, the flow, equable, and circular motion of the machine: it needs only be added, that their frizer is but about two feet long and one broad; and that, to form the nap more eafily they moiften the furface of the ftuff lightly, with water mingled with whites of eggs or honey.

FROBISHER's STRAITS, in weft Greenland, lie a little to the northward of cape Farewel: weft long. 48°, and north lat. 63°.

FRODINGHAM, a market town of Yorkfhire, thirty miles eaft of York.

FRODSHAM, a market-town of Chefter, fourteen miles north-eaft of Chefter.

FROG, *rana*, in zoology, a genus of amphibious animals, the body of which is broad and fhort, without a tail, and furnifhed with four legs.

Befides the common frog, there are a great many other fpecies, the moft fingular of which is that called the bull-frog, a native of the northern parts of America, with four divided toes on the fore-feet, and five webbed ones on the hinder. This, when the limbs are extended, meafures near two feet; the trunk of its body being about eight inches long, and four or five in breadth: it is very voracious, and frequently fwallow young ducks, and other water-fowl, before they have ftrength to fhift for themfelves. Its croaking is fo loud as to refemble the roaring of a bull heard at a diftance, whence its name of bull-frog. There is alfo another very extraordinary fpecies of frog, called the tree-frog, from its living on trees and plants of various kinds: alfo the green frog, from its colours; its body is about an inch and a half long.

FROG, among farriers, the fame with frufh. See the article FRUSH.

FROG-FISH, the rana pifcatrix of authors. See the article RANA PISCATRIX.

FROME, a market-town of Somerfetfhire, nine miles fouth of Bath.

FRONDES, among botanifts, denote leaves confifting of feveral other leaves, and forming the whole of the plant; as is the cafe of the fern-kind, in which, the fructification being on the back of the leaves, the fingle leaf makes the whole plant, and is called frondis, not folium.

FRONT *of a battalion*, among military men, is the firft rank, or file-leaders. It is likewife called the face or head of a battalion. In like manner,

FRONT *of a fquadron*, is the firft rank of troopers.

FRONT *of a camp*, the foremoft row of tents in the firft line, which are the quarter-mafters tents in the horfe, and ferjeants in the foot.

FRONT *of an army* confifts of a certain number of fquadrons and battalions.

FRONT *of a place*, or the TENAILLE, in fortification, all that is contained between the flanked angles of the two neighbouring baftions, *viz.* the two faces, two flanks, and the curtin.

FRONT, in architecture, the principal face or fide of a building, or that which is prefented to the chief afpect or view.

FRONT, in perfpective, a projection or reprefentation of the face or forepart of an object, or of that part directly oppofite to the eye, which is more ufually called the orthography. See ORTHOGRAPHY.

Line of the FRONT. See the article LINE.

FRONT SCALE. See the article SCALE.

FRONTAL, in architecture, a little fronton, or pediment, fometimes placed over a little door, or window.

FRONTAL, or FRONTLET, or BROW-BAND, is alfo ufed in fpeaking of the jewifh ceremonies.

This frontal confifts of four feveral pieces of vellum, on each whereof is written fome text of fcripture: they are all laid on a piece of calf's leather, with thongs to tie it by.

The Jews apply the leather with the vellum on their foreheads in the fynagogue, and tie it round the head with the thongs.

FRONTALE OS. See FRONTIS OS.

FRONTALE, in medicine, a name for any external medicine, or topic, applied to the forehead: more particularly it means a refrigerating and hypnotic remedy, prepared of cold cephalics, bruifed and tied up in a linen bag, four or five fingers breadth.

FRONTAL MUSCLES, in anatomy, two of the four mufcles of the cutis of the cranium. See the article SKULL.

The frontal mufcles are very thin: they are fituated under the fkin of the forehead, and have both their extremities moveable, excepting only for a few fibres, which arife from the inferior edge of the os frontis. They are extended on each fide under the eye-lids, near the larger canthus of the eye, beyond the middle of the orbit, towards the leffer canthus; and extended fomewhat obliquely outwards over the os frontis: after this, they expand their tendons over the upper part of the cranium, and feem to be joined with

with the aponeuroses of the occipitales, which are fixed. By this means they are able to move the skin of the forehead and eye-brows. The antagonists to these are the orbiculares palpebrarum, on which they are affixed. See ORBICULARIS.

FRONTATED, a term used by botanists relating to the leaf of a flower, which grows broader and broader, perhaps terminating in a right line: and is used in opposition to cuspidated, that is, when the leaves of the flower end in a point.

FRONTEIRA, a town of Portugal, in the province of Alentejo: west lon. 8° 6′, and north lat. 38° 50′.

FRONTIER, the border, confine, or extremity of a kingdom or province, which the enemies find in front, when they would enter the same: thus we say, a frontier town, a frontier province, *&c.* Frontiers were antiently called marches.

FRONTIS OS, in anatomy, called also os coronale, the bone of the forehead. See the article FACE.

This is a bone of the cranium, of an irregular form, double in infants, but in adults usually single: sometimes, however, it is divided in these into two parts down to the nose. It is situated in the anterior part of the skull, and forms that part of the face which is called the forehead, from whence it has its name. Its figure is symmetrical, resembling a large shell, almost round. See SKULL.

The os frontis is articulated, by suture, to seven other bones; the ossa parietalia, os ethmoides, os sphenoides, ossa lachrymalia, ossa nasi, maxillaria, and the ossa malarum. See the articles SUTURE, PARIETALIA OSSA, *&c.*

The os frontis contains the anterior lobes of the brain, and a portion of the longitudinal sinus; and forms the forehead, the upper part of the orbits, and a portion of the temples. See BRAIN.

In the internal surface of the os frontis there is a fovea, or furrow, and an eminence, to which the longitudinal sinus of the dura mater adheres: on its external surface are situated the frontal and temporal muscles, and the cartilaginous annule of the musculous trochlearis of the eye. See TROCHLEARES, *&c.*

FRONTIGNIAC, a town of Languedoc, in France, situated sixteen miles south-west of Montpelier, and remarkable for producing excellent wine.

FRONTIGNIAC is also the name of a fort, situated on the river St. Laurence, in North America: west longitude 77° and north latitude 43° 20′.

FRONTISPIECE, in architecture, the portrait or principal face of a building. See the article BUILDING.

FRONTISPIECE is also used to signify an ornament fronting the title-page of a book, which, in some measure, should express the subject treated of.

FRONTLET, or FRONTAL. See the article FRONTAL.

FRONTON, in architecture, the same with pediment. See PEDIMENT.

FROST, in physiology, such an excessively cold state of the air, as converts watery fluids into ice. See FREEZING and ICE. In very cold snowy weather, not only water, but urine, beer, ale, milk, vinegar, and even wine, are either wholly or in part, converted into ice, though the last but slowly. As to the freezing of expressed oils, a very intense cold may deprive them of their fluidity, so as to be capable of being cut into portions of any figure; but whether they are convertible into real ice, is not yet determined. In Russia oil freezes much harder than with us, but does not even there become perfect ice. Common anise-seed water, and the like weak spirits, are said to be converted into an imperfect ice in Muscovy; and the strong spirits into a substance like that of oil. When brandy freezes, a liquid part, much stronger than common brandy, retires to the center of the vessel.

Even solid bodies are liable to be affected by frost: timber is often apparently frozen, and rendered exceedingly difficult to saw. Marle, chalk, and other less solid terrestrial concretions, will be shattered by strong and durable frosts. Metals are contracted by frost: thus, an iron-tube twelve feet long, upon being exposed to the air in a frosty night, lost two lines of its length. On the contrary, it swells or dilates fluids near one tenth of their bulk. Mr. Boyle made several experiments with metalline vessels, exceeding thick and strong; which being filled with water, close stopped, and exposed to the cold, burst by the expansion of the frozen fluid within them. Trees are frequently burnt up with frost, as with the most excessive heat; and in very strong frosts, walnut-trees, ashes, and even oaks, are sometimes miserably split and cleft, so as to be seen through, and this with a terrible noise like the explosion of fire-arms.

Frost

Froſt naturally proceeds from the upper parts of bodies downwards; but how deep it will reach in earth or water, is not eaſily known, becauſe this depth may vary with the degree of coldneſs in the air, by a longer or ſhorter duration of the froſt, the texture of the earth, the nature of the juices wherewith it is impregnated, the conſtitution of its more internal parts, as to heat and cold, the nature of its effluvia, &c. Mr. Boyle, in order to aſcertain this depth, after four nights of hard froſt, dug in an orchard, where the ground was level and bare, and found the froſt had ſcarce reached 3 ½ inches; and in a garden nearer the houſe, only 2 inches below the ſurface. Nine or ten ſucceſſive froſty nights froze the bare ground in the garden 6 ½ inches deep; and in the orchard, where a wall ſheltered it from the ſouth ſun, to the depth of 8 ½ inches. He alſo dug in an orchard, near a wall, about a week afterwards, and found the froſt to have penetrated to the depth of 14 inches. In a garden at Moſcow, the froſt in a hard ſeaſon, only penetrates to 2 feet: and the utmoſt effect that Capt. James mentions the cold to have had upon the ground of Charleton-iſland, was to freeze it to 10 feet deep: whence may appear the different degrees of cold of that iſland and Ruſſia. And as to the freezing of water at the above-mentioned iſland, the captain tells us, it does not naturally congeal above the depth of 6 feet, the reſt being by accident. Water alſo, expoſed to the cold air in large veſſels, always freezes firſt at the upper ſurface, the ice gradually increaſing and thickening downwards; for which reaſon frogs retire in froſty weather to the bottom of ditches: and it is ſaid, that ſhoals of fiſh retire in winter to thoſe depths of the ſea and rivers; where they are not to be found in ſummer. Water, like the earth, ſeems not diſpoſed to receive any very intenſe degree of cold at a conſiderable depth or diſtance from the air; the vaſt maſſes of ice found in the northern ſeas being only many flakes and fragments, which ſliding under each other, are, by the congelation of the intercepted water, cemented together.

In cold countries, the froſt proves often fatal to mankind; not only producing cancers, but even death itſelf. Thoſe who die of it have their hands and feet firſt ſeized, till they grow paſt feeling it; after which the reſt of their bodies is ſo invaded, that they are taken with a drowſineſs, which if indulged, they awake no more, but die inſenſibly. But there is another way whereby it proves mortal, *viz.* by freezing the abdomen and viſcera, which on diſſection are found to be mortified and black. See the article Cold.

Sharp froſts of long continuance, are very prejudicial to fiſh in ſhallow ſtanding waters; but if the water be deep, or there be either a current or freſh ſpring in the place, the fiſh generally eſcape. Ponds, therefore, ſhould be made large and deep, at leaſt one part of them ought to be conſiderably deep, to ſerve as a place of refuge in caſe of extreme cold. The ſymptom of mortality in a pond, is the appearance of the fiſh; for nothing but the pangs of death can make them move from the bottom in froſty weather. The only effectual method to ſave fiſh in this caſe, is to ſet great tubs or fats full of water in ſome out-houſe, not far from the fire; then making holes in the ice, the fiſh will gather about them, as if they came up for freſh air; and are to be taken out and put into the tubs, where they may be kept till the froſt breaks, taking care to freſhen the water every twelve hours. Sometimes fiſh that have been dead to all appearance, and others frozen and enveloped in ice, have been preſerved by putting them into water brought to midſummer heat; for in ſix or ſeven hours the ice will be diſſolved, and the fiſh appear as briſk and well as ever; after which they are to be put into waters, where the froſt cannot injure them.

Hoar-Frost, *pruina*, a cold moiſt vapour, that is drawn up a little way into the air, and in the night falls again on the earth, where it is congealed into icy cryſtals of various figures. Hoar-froſt, therefore, is nothing but dew, turned into ice by the coldneſs of the air. See Dew.

FROTH, a white, light ſubſtance, formed on the ſurface of fluids, by vehement agitation, conſiſting of little ſpherules, or globules.

Froth-spit, or Cuckow-spit, a name given to a white froth, or ſpume, very common in the ſpring, and firſt months of the ſummer, on the leaves of certain plants, particularly on thoſe of the common white field lychnis, or catch-fly, thence called by ſome ſpatling poppy.

All writers on vegetables have taken notice of this froth, though few have underſtood

derftood the caufe or origin of it till of late; being formed by a little leaping animal, called by fome the flea grafs-hopper; by applying its anus clofe to the leaf, and difcharging thereon a fmall drop of a white vifcous fluid, which containing fome air in it, is foon elevated into a fmall bubble: before this is well formed, it depofites fuch another drop, and fo on, till it is every way overwhemed with a quantity of thefe bubbles, which form the white froth which we fee.

FROTH, or FOAM, in the manege, a moift, white matter, that arifes from the mouth of a horfe. A horfe that, by champing on his bridle, throws out a great deal of froth, is judged to be a horfe of mettle and health, and to have a cold frefh mouth.

FROWER, an edged tool ufed in cleaving wood into laths.

FROZEN. See the articles FROST, FRIEZING, ICE, *&c.*

FROZEN or FRIGID-ZONE. See the article ZONE.

FRUCTIFEROUS, fignifies properly any thing that produces fruit; but, in a more large and figurative fenfe, it is ufed by fome, particularly lord Bacon, for fuch experiments in natural philofophy, as prove advantageous to the experimenter in point of gain or profit.

FRUCTIFICATION, among botanifts, in a more lax fenfe, includes the flower and fruit, with their feveral coverings. See the articles FLOWER and FRUIT.

Strictly fpeaking, however, the term fructification fignifies only the male and female organs of generation, called the ftamina and piftil. See STAMINA, PISTIL, and GENERATION.

FRUCTISTS, *fructiftæ*, in botany, that fort of authors who have attempted the eftablifhing the claffes and diftinctions of plants upon the fruit, feed, or receptacle of thefe in plants. Of this lift are Cæfalpinus, Morifon, Ray, Herman, and Boerhaave.

FRUGIVOROUS BIRDS, are fuch as feed on fruits, either wholly or in part.

The frugivorous birds, according to Mr. Willoughby, are a fpecies of terreftrial birds, fome of which have crooked bills and claws, yet are of gentler nature, and not rapacious.

FRUIT, in general, includes whatever the earth produces for the nourifhment and fupport of man, and other animals, as herbs, grain, hay, corn, *&c.* See the articles HERB, GRAIN, *&c.*

FRUIT, more properly, fignifies the production of a tree, or plant, for the propagation or multiplication of its kind, in which fenfe the word takes in all kinds of feeds, with their furniture. But botanifts, ufually underftand by it that part of a plant wherein the feeds are contained. See PLANT and SEED.

FRUIT alfo implies an affemblage of feeds in a head; as in a ranunculus, *&c.* and all kinds of feeds, or grains, whether inclofed in a cover, capfule, or pod; and whether bony, flefhy, fkinny, membranous, or the like.

The fruit in all plants, is the product, or refult, of the flower; or that for the production and nutrition of which the flower was intended.

The ftructure and parts of different fruit differ in fome things, but in all the fpecies, the effential parts of the fruit appear to be only continuations or expanfions of thofe which are feen in the other parts of the tree; and the fame fibres are continued to them from the root. An apple, cut in two tranfverfely, will be found principally compofed of four parts. 1. A fkin, or rind, which is only a continuation and expanfion of the outer bark of the tree. 2. A parenchyma, or pulp, which is an expanfion and intumefcence of the blea, or inner bark of the tree. 3. The fibres, or ramifications of the woody part of the tree. 4. The core, which is the produce of the pith of the wood, indurated, or ftrengthened by twigs of the woody fibres intermixed with it. This ferves to furnifh a proper lodging for the feeds, and filtrates the juices of the parenchyma, or pulp, and conveys them to the feeds.

Of the fibres there are generally reckoned fifteen branches, of which, ten penetrate the parenchyma, and incline to the bafis of the flower; the other five afcend more particularly from the pedicle, or ftalk, and meet with the former at the bafe of the flower; and to thefe branches the capfulæ, or coats of the kernel, are faftened. Thefe branches, being firft extended through the parenchyma to the flower, furnifh the neceffary matter for the vegetation of it, but as the fruit increafes, it intercepts the aliment, and by this means the flower is ftarved, and falls off.

In a pear, there are five parts to be diftinguifhed; the fkin, parenchyma, ramification, ftone and acetarium; the firft three

three parts are common to the apple: the ftone, obferved chiefly in choak-pears, is a congeries of ftony corpufcles, which are difperfed throughout the whole parenchyma, but in the greateft plenty, and amaffed clofeft together, about the center of the acetarium. This feems formed of the ftony or calculous part of the nutricious juice.

The acetarium is a fubftance of a tart, acid tafte, and of a globular figure, inclofed in an affemblage of feveral of the ftony parts before-mentioned.

In plums, cherries, &c. there are four parts, *viz.* a coat, parenchyma, ramification, and ftone. The outer part, or fhell of the ftone, feems formed of the calculous part of the nutricious juice of the plant; and the inner part, or kernel, of the pith of the tree, derived thither by feminal branches, which penetrate the bafe of the ftone. The acorn confifts of a fhell, cortex, and medulla; the fhell confifts of a coat and parenchyma, derived from the bark and wood of the tree. The cortex confifts of an inner and outer part, the firft of which is a duplicature of the inner trunk of the fhell; the fecond is a fofter fubftance, derived from the fame fource as the parenchyma of the fhell. But authors are not agreed whether the medulla, or pulp of the kernel, doth arife from the pith of the tree, or from the cortical part thereof.

Berries, grapes, &c. contain, befides three general parts, *viz.* coat, parenchyma, and ramification, grains of a ftony nature, which are the feeds.

Ufe of FRUITS. Fruits are ferviceable in guarding, preferving, and feeding the inclofed feed; in filtrating the coarfer, more earthy and ftrong parts of the nutritious juice of the plant, and retaining it to themfelves, fending none but the moft pure, elaborated and fpirituous parts to the feed, for the fupport and growth of the tender delicate embryo, or plantule, therein contained.

The ufe of fruits, with us, might be rendered much more extenfive than it is. Many fruits, which do hurt when eaten raw, would make wines equal in flavour to many of thofe now obtained at great prices from abroad; and lands which will not bear corn, yet would bear trees and fhrubs, producing fuch fruits.

Cherries, properly managed, make an excellent wine, and that in very large quantities, and plums alfo make a very agreeable kind; but that it has an aufterenefs, which muft be taken off by mixing a little fugar with it, when in the glafs, not before it is drawn off. A coarfe plum, a little larger than a damfon, is the beft kind for this wine, being a fort of plum that grows wild in our hedges. The wine made from it is of a very confiderable ftrength, and affords a pleafant brandy, by diftillation, in confiderable quantities. Our common garden currants afford a very agreeable wine; and our goofeberries are not fecond to any thing. See BRANDY, WINE, &c. The various ufes of different fruits in the materia medica, &c. may be feen in the courfe of this work, each under its proper head.

Prefervation of FRUIT. In the Philofophical Tranfactions, n° 237, we have a receipt for preferving fruit and flowers for a whole year, which is as follows. Take falt petre, one pound; bole armoniac, two pounds; common clean fand three pounds: mix them together; and, in dry weather, take fruit or flowers of any fort, not fully ripe, each with its ftalk, and put them fingly into an open glafs, till it be full; cover it clofe with oil cloth; and in a dry cellar, put each of thefe glaffes four fingers-deep under ground, fo that quite round above, as well as below, there may remain two fingers thick of the mixture.

To preferve quinces, apples, &c. lord Bacon directs us to plunge them in honey; but as that may give them an over lufcious tafte, to dip them in fyrup of wine, boiled to a due height. The confervation of fruit, continues that author, fhould be tried in veffels filled with fine fand, or powder of chalk; or in flour, the duft of oakwood, &c. Fruits intended for long keeping, he fays, fhould be gathered before they are full ripe, and in a fair day, towards noon, the wind not blowing fouth, and the moon being under the horizon, and in her decreafe.

Firft FRUITS. See FIRST FRUITS.

FRUIT-TREES. With regard to fruit-trees it may be obferved, 1. That the cutting and pruning them, when young, prevent their bearing, though it contributes to the richnefs and flavour of the fruit, as well as to the beauty of the tree. 2. That kernel fruit-trees come later to bear than ftone fruit-trees; the time required by the firft before they come to any fit age for

for bearing, being one with another five years; but when they do begin, they bear in greater plenty than ftone-fruit. 3. That ftone-fruit, figs, and grapes, commonly bear confiderably in three or four years; and bear full crops the fifth and fixth years; and hold it for many years, if well ordered. 4. That fruit-trees in the fame neighbourhood will ripen a fortnight fooner in fome grounds than in others of a different temperature. 5. That in the fame country hot or cold fummers fet confiderably forwards, or put backwards the fame fruit. 6. That the fruit on wall-trees generally ripen before thofe on ftandards, and thofe on ftandards before thofe on dwarfs. 7. That the fruit of all wall-trees planted in the fouth and eaft quarters, commonly ripen about the fame time, only thofe in the fouth rather earlier than thofe in the eaft; thofe in the weft are later by eight or ten days, and thofe in the north, by fifteen or twenty. For the planting, pruning, grafting, &c. of fruit-trees, fee the articles PLANTING, TRANSPLANTING, PRUNING, GRAFTING, ORCHARD, GARDEN, NURSERY, &c.

FRUITERY, a place for the keeping of fruit, a fruit-houfe, or fruit-loft.

A fruitery fhould be inacceffible to any thing of moifture, and fhould be as much as poffible fo, even to froft.

FRUITFULNESS, the quality of bearing plenty of fruit. See FRUIT.

FRUMENTACEOUS, a term applied, by botanifts, to all fuch plants as have a conformity with wheat, in refpect of their fruits, leaves, ears, or the like.

FRUMENTARII, a kind of foldiers, or archers, under the weftern empire.

The firft time we read of thefe officers is in the time of the emperor Adrian, who made ufe of them to inform himfelf of whatever paffed. They did not make any particular corps diftinct from the reft of the forces, but there was a certain number of them in each legion. It is fuppofed that they were at firft a number of young perfons difpofed, by Auguftus, throughout the provinces, particularly on all the grand roads, to acquaint the emperor, with all expedition, of every thing that happened.

Afterwards they were incorporated into the troops themfelves, where they ftill retained their antient name.

Their name of frumentarii is derived from their being alfo a fort of purveyors to the armies, cities, &c. collecting all the corn from the feveral provinces to furnifh the common-wealth.

FRUMENTATION, in roman antiquity, a largefs of corn beftowed on the people.

This practice of giving corn to the people was very antient among the Romans; and frequently ufed to footh the turbulent humour of the populace. At firft the number of thofe to whom this largefs was given, was indeterminate, till Auguftus fixed it at two hundred thoufand.

FRUMENTY, or FURMETY, a kind of pottage, made up of wheat, milk, fugar, fpice, &c.

FRUMGYLD, in old law books, fignifies the firft payment made to the kindred of a perfon flain, by way of recompence for his murder.

FRUMSTOL, a term antiently ufed for a manfion-houfe.

FRUSH, or FROG, among farriers, a fort of tender horn which arifes in the middle of a horfe's fole; and, at fome diftance from the toe, divides into two branches, running towards the heel in the form of a fork.

The frufh is a part of a horfe's foot, the top of which only fhould be pared, and that every time the foot is pared, otherwife it is apt to corrupt.

FRUSTUM, in mathematics, a part of fome folid body feparated from the reft.

The fruftum of a cone is the part that remains, when the top is cut off by a plane parallel to the bafe; and is otherwife called a truncated cone; for finding the furface and folidity of which, fee the article CONE.

The fruftum of a pyramid is alfo what remains after the top is cut off by a plane parallel to its bafe, the menfuration of which will be found under the article PYRAMID.

The fruftum of a globe or fphere is any part thereof cut off by a plane, the folid contents of which may be found by this rule. To three times the fquare of the femidiameter of the bafe, add the fquare of its height; then multiplying that fum by the height, and this product multiplied by .5236 gives the folidity of the fruftum. See the article SPHERE.

A fruftum or portion of any folid, generated by the revolution of any conic fection upon its axis, and terminated by any two parallel planes, may be thus compared to a cylinder of the fame altitude, and whofe bafe is equal to the middle fection of the fruftum made by

 a pa-

a parallel plane. 1. The difference between fuch fruftum and cylinder is always the fame in different parts of the fame or of fimilar folids; when the inclination of the planes to the axis, and the altitude of the fruftum are given. 2. In the parabolic conoid, this difference vanifhes; the fruftum being always equal to a cylinder of the fame height, upon the fection of the conoid that bifsects the altitude of the fruftum, and is parallel to its bafes. 3. In the fphere, the fruftum is always lefs than the cylinder, by one fourth part of a right-angled cone of the fame height with the fruftum; or, by one half of a fphere, of a diameter equal to that height: and this difference is always the fame in all fpheres whatever, when the altitude of the fruftum is given. 4. In the cone, the fruftum always exceeds the cylinder, by one fourth part of the content of a fimilar cone, that has the fame height with the fruftum. See Mac Laurin's Fluxions, p. 24. where he likewife compares the fruftums of the hyperbolic conoid and fpheroid with a cylinder. See alfo GAUGING.

FRUTEX, among botanifts, denotes a fhrub. See the article SHRUB.

FRUTEX ÆTHIOPICUS and AFRICANUS, a name given to feveral fpecies of pine. See the article PINE.

FRUTICOSE STALKS, among botanifts, thofe with a hard woody fubftance. See the article STALK.

FRY, in zoology, fignifies the fpawn, or rather young, of fifh. See FISH.

FRYTH, or FRITH, in old law books. See the article FRITH.

FUAGE, in old writers, a tax of 12 d. for every fire, levied in the time of Edw. III.

FUCHSIA, in botany, a genus of plants, the characters of which are not perfectly afcertained. The flower confifts of a fingle petal, the tube is elevated; the limb is divided into eight fegments, and plane; the fegments are acuminated, and alternately lower; the fruit is a roundifh berry, marked with four furrows, and containing four cells: the feeds are numerous, oval, and placed in a double feries.

FUCUS, in botany, a genus of fubmarine plants, belonging to the cryptogamia clafs of Linnæus.

The fucus confifts of a tough matter, formed into a kind of leaves, which are flat and varioufly divaricated; and which have fome appearance of fructification in punctated tubercles, covering oblong veficles, fuppofed by Linnæus to be male flowers; and fmooth, roundifh veficles, hollow and interwoven with filaments, which appear to him to be female flowers. There are a great many fpecies of fucus with broader or narrower leaves, and other peculiarities; one of which, the broad-leaved, ferrated fucus, grows to the height of fix, eight, or more inches.

FUCUS is alfo ufed for a paint, or compofition applied on the face to beautify it, and heighten the complexion.

The fucus of the Roman dames was a kind of white earth or chalk, brought from Chio and Samos, diffolved in water. The fucus folimanni is a compofition of prepared fublimate, in great repute among the Spaniards of Peru.

FUEL, whatever is proper to burn or make a fire; as, 1. Wood, which fhould be fo felled that cattle may have the browfing of it; for in winter they will not only eat the tender twigs, but even the very mofs. The underwood is ufually felled for fuel; but if the head or top be ufed for firing, it is beft to begin three or four feet above the timber, if confiderable. 2. Foffil and bituminous earths, as turfs and peats. 3. Sulphureous foffils of a firmer texture, as the common coals, fcotch coals, cannel-coal, &c.

It is provided by ftatute, that wood-fuel fhall not be felled under the affize, *viz.* a faggot bound is to be three feet in length, and have the bond twenty-four inches round, befides the knot. Billets alfo are to be of a certain length, on certain penalties. See the article BILLET.

The fuel, in chemical operations, muft be chofen fuitable to the intention. The natural fun, in fummer, fuffices for infolations. A fpirit-lamp may be made to give a moderate, or a confiderably ftrong heat, according to the number of wicks employed. The lighter fuels, fuch as ftraw, leaves, twigs, &c. come next in order, after fpirit of wine; then oils, wax, rofin, pitch, and, laftly, folid wood, coals, and turf: all which may have their proper furnaces, fo as to be burnt in the requifite quantity, and with requifite fiercenefs or flownefs. To excite the greateft degree of heat, the rule is to ufe the denfeft fuel in large quantities, which muft be blown inceffantly with bellows all round the fire wherein the matter to be acted on is lodged.

FUENTE

FUENTE DUENA, a town of New-Castile, in Spain, 35 miles south-east of Madrid.

FUGA VACUI in the antient schools of philosophy, a supposed aversion in nature to a vacuum. See VACUUM.

FUGALIA, in roman antiquity, a feast supposed by some to be the same with the regifugium, held on the 24th of February, in memory of the expulsion of the kings, and the abolishing of the monarchical government. Others again, distinguish the fugalia from the regifuge. And others think, that the fugalia was the same with the poplifugia; or the feast of fugia, the goddess of joy, occasioned by the rout of an enemy, which was the reason the people abandoned themselves to riot and debauchery.

FUGAM FECIT, in law, is when it is found by inquisition that a person fled for felony, &c.

If flight and felony be found on an indictment for felony, or before the coroner, where the murder is committed, the offender shall forfeit all his goods, and the issues of his lands, till he is acquitted or pardoned: and upon finding before justices of oyer, &c. that the offender fled, though he be acquitted on his trial, he forfeits his goods.

FUGITIVE, a person obliged to fly his country, or remove from a place where he had some abode, or establishment, on account of his crimes, debts, or other occasions.

FUGITIVE'S GOODS, the proper goods of the person that flies on a felony committed by him, which, after the flight, is lawfully found to belong to the king, or lord of the manor.

FUGITIVES OVER SEA, persons that go over sea without the king's licence, who, unless they are merchants, or eminent persons, forfeit all their goods.

FUGUE, in music, is when different parts of a musical composition follow each other; each repeating what the first had performed.

There are three kinds of fugues; the simple, double, and counter.

Single, or *Simple* FUGUE, is some point consisting of four, five, or more notes, begun by one simple part, and seconded by a second, third, fourth, fifth, &c. if the composition consist of so many; repeating the same, or such like, notes; (*i. e.* in the same proportion) so that the several parts follow, or come in one after another, in the same manner; the leading part still flying before those that follow.

FUGUE DOUBLE, or FUGA DOPPIA, is when two or more different points move together in a fugue, and are alternately mixed and interchanged by the several parts. See the article PART.

Counter FUGUE. See COUNTER.

FULCRUM, in mechanics, the prop or support, by which a lever is sustained. See the article LEVER.

FULD, a town and abbey of Germany, the abbot of which is a prince of the empire: east long. 9° 35′, north lat. 50° 24′.

FULICA, the COOT, in ornithology, a genus of birds, of the order of the gallinæ, with a naked or bald forehead, and divided or cloven feet: add to this, that all the toes are longer than in whole-footed birds, and have semi-circular membranes affixed to their joints.

Of this bird, authors mention several species, all distinguished by their cloven toes, and a fleshy excrescence bare of feathers, and reaching from the bill almost to the crown of the head.

FULIGINOUS, whatever proceeds from a thick, sooty smoke, such as litharge and lamp-black.

FULIGNO, a city of Italy, in the pope's territories, ten miles north of Spoletto.

FULIGO, in natural history, a species of pumice-stone. See PUMICE.

FULIGULA, in ornithology, the name by which authors call the tufted duck, with a hanging crest, a black body, and white belly, and a white spot on the wings. It is about the size of the common duck.

FULL-MOON, *plenilunium*, that phasis of the moon when, in her opposition to the sun, the whole of her disc is illuminated; in which time eclipses of the moon can only happen. See the articles MOON and ECLIPSE.

FULLER, a workman employed in the woolen manufactories, to mill, or scour, cloths, serges, and other stuffs, in order to render them more thick, compact, and durable. See the article CLOTH.

Fullers, in conformity to the regulations of the manufacturers in France, are obliged to mark their stuffs with a particular lead after fulling. They are forbid, by the same regulations, to draw out, or tenter-stretch, their manufactures, that they may be made greater in length, and narrower in breadth, &c.

FULLER'S EARTH, *terra fullonica*, in natural history, a soft, greyish, brown, dense,

dense, and heavy marle: when dry, it is of a greyish, ash-coloured brown, in all degrees from very pale to almost black, and it has generally something of a greenish cast: it is very hard and firm, of a compact texture, of a rough and somewhat dusty surface, that adheres slightly to the tongue: it is very soft to the touch, not staining the hands, nor breaking easily between the fingers: it has a little harshness between the teeth, and melts freely in the mouth: thrown into water, it makes no ebullition, or hissing, but swells gradually in bulk, and falls into a fine soft powder. It makes no effervescence with aqua fortis.

It is of great use in scouring cloths, stuffs, &c. imbibing all the grease and oil used in preparing, dressing, &c. of the wool, for which reason it is made a contraband commodity, and is not to be exported under the penalty of 1 s. for every pound weight. See FULLING.

FULLER'S WEED, in botany, a name sometimes given to the dipsacus, or teasel. See the article DIPSACUS.

FULLERY, a place where cloths, &c. are fulled. See the next article.

FULLING, the art or act of scouring and pressing cloths, stuffs, stockings, &c. to cleanse, thicken, and render them more firm and strong, which is done by means of a water-mill.

For the description of this mill, see plate CVIII. fig. 1. in which, 1. is the track of the wheel, that turns on the outside; 2. a front view of the wheel; 3. the arbour with its leavers, which, as they pass, raise the heads of the wooden mallets, and let them fall alternately; 4. the trough, which in the plate is hid behind the timber work, and is only expressed by dots that shew its position: each trough has at least two, and sometimes three mallets; 5. the head of the mallet, with three or four notches, which hinder the stuff from sticking under the hammer; 6. the arm or handle; 7. the end of the mallet fastened by a pin. 8. In the troughs are laid the cloths, stuffs, &c. intended to be fulled: then letting the current of water fall on the wheel, the mallets are successively let fall upon them, when by their weight and velocity they stamp and press the stuffs very strongly, which by this means become thickened and condensed.

In this operation, fuller's earth is used with some proportion of soap; but soap alone would do much better, was it not dearer than fuller's earth.

Fulling of stockings, caps, &c. is performed either with the hands or feet, or a kind of wooden machine, either armed with wooden teeth, or those of horses or bullocks. The ingredients generally used on this occasion are fuller's earth, urine, white soap and green soap. But water softened with chalk is far preferable.

The following is M. Colmet's method of fulling with soap, grounded on experiments made by order of the marquis de Louvois. Let a coloured cloth of about forty-five ells be laid in the usual manner in the trough of a fulling-mill, without first soaking it in water, as commonly practised in most places. To full this troughful of cloth, fifteen pounds of soap are required, one half of which is to be melted in two pails of river or spring water, made as hot as the hand can bear. Let this solution be poured by little and little, upon the cloth, in proportion as it is laid in the trough; thus it is to be fulled for at least two hours; after which, let it be taken out and stretched. This done, let the cloth be immediately returned into the same trough, without fresh soap, and there fulled two hours more. Then take it out, wring it well, and express all the grease and filth. After the second fulling, dissolve the remainder of the soap, as the former part, and throw it at four several times on the cloth, not forgetting to take it out every two hours, to undo the plaits and wrinkles it got in the trough. When it is sufficiently fulled, and brought to the requisite quality and thickness, it is scoured out for good in hot water, keeping it in the trough till it be thoroughly clean.

As white cloths full more easily than coloured ones, a third part of the soap may be spared.

FULLO, in ichthyology, a name used by several authors for the tench.

FULMINATING, something that thunders, or resembles thunder. See the article THUNDER.

Naturalists speak of fulminating gold, fulminating powder, &c. See the articles AURUM, PULVIS, &c.

FULMINATING LEGION, in antiquity. See the article THUNDERING LEGION.

FULMINATION, in chemistry, is used in a synonymous sense with detonation. See the article DETONATION.

Fulmination in the depuration of the more perfect metals, is, when upon infusing

fusing them with lead, a brighter colour succeeds a kind of sulphureous cloud, before appearing in the metals, during the fusion.

FULMINATION, in the romish canon-law, a sentence of a bishop, official, or other ecclesiastic appointed by the pope, by which it is decreed, that some bull sent from the pope shall be executed.

FULMINATION is also used for the denunciation, or execution of a sentence of anathema, made public with due solemnity. See ANATHEMA.

FUMARIA, in botany, a genus of the diadelphia hexandria class of plants, with a polypetalous anomalous flower, the petals of which are oblong and tubulated: the fruit is a small unilocular pod, containing a number of roundish seeds.

This genus comprehends the fumitory, bastard-fumitory, capnoides, cysticapnos, cucularia, corydalis, and capnorchis of authors; some with a roundish, others with an ovato-acuminated, and others with a very long pod.

The whole plant of fumitory is used in medicine, being accounted good in the scurvy, jaundice, and disorders of the mesentery and spleen.

FUME, in medicine. See FUMIGATION.

FUMET, a term used by sportsmen for the ordure, or dung, of harts.

FUMIGATION, in chemistry, a kind of calcination, when metals, or other hard bodies, are corroded, or softened, by receiving certain fumes for that purpose.

FUMIGATION, in medicine, the application of fumes to particular parts of the body; as those of factitious cinnabar, to venereal ulcers. See the article ULCER.

An hysteric fume is made of an ounce of assa fœtida, and a pound of the best white-wine vinegar, boiled in a pot with a narrow mouth, to which the patient should hold her head, with her mouth open. Steams received this way up the nose, have very sudden and remarkable effects, but this application seems justifiable only in cases where other means cannot be used. See HYSTERIC.

A fumigation for a catarrh is made by taking olibanum, amber, benjamin, gum guaiacum, and balsam of Tolu, of each two scruples: and making them all into a gross powder to burn.

Where the defluxion is very thin, and has much of its cause in the laxity of the glands, such means may do service, by constringing the parts, and repelling the flux; but where there is an asthma, and very weak lungs, it may be very inconvenient. See the article CATARRH.

To make a fumigation against the falling down of the anus, or fundament. Take frankincense, mastic, amber, and cloves, of each a dram; red rose leaves, balaustines, of each two drams; make them into a gross powder.

This is to be burnt upon a chaffing-dish of coals, under a chair, with a hole in it; over which the patient is to sit with the bare part to it, after the gut is thrust up; and by such means continued, will the sphincter at last get strength enough to keep it up, without any such help. In a tenesmus it is also of use. See the article PROLAPSUS.

A fumigation against the falling down of the womb is made by taking myrrh, mastic, cinnamon, and spikenard, of each a dram; mint and red roses of each two drams; cloves, zedoary, and pimento of each half a dram. Make all into a powder to burn.

This is to be used as the preceding; and in the same weakness it is also good, as that is of service in this.

Fumes from hot aromatic liquors, which are sometimes directed to the same purposes, are hardly so efficacious as those which arise from the burning of dry ingredients, because their moisture prevents their being so immediately restringent.

FUMITORY, *fumaria*, in botany. See FUMARIA.

FUNAMBULI, in antiquity, rope dancers. See the article DANCE.

FUNCHAL, the capital of the Madeira-islands, subject to Portugal: west long. 16°, north lat. 32° 33′.

FUNCTION, the act of fulfilling the duties of any employment.

FUNCTION, being also applied to the actions of the body, is by physicians divided into vital, animal, and natural. The vital functions are those necessary to life, and without which the individual cannot subsist; as the motion of the heart, lungs, &c. The natural functions are such as it cannot subsist any considerable time without them, as the digestion of the aliment, and its conversion into blood. Under animal functions are included the senses of touching, tasting, &c. memory, judgment, and voluntary motion, without any or all of which an animal may live, but not very comfortably.

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The animal functions perform the motion of the body by the action of the muscles, and this action consists chiefly in the shortening the fleshy fibres, which is called contraction, the principal agents of which, are the arteries and nerves distributed in the fleshy fibres. See the articles ARTERY and NERVE.

In short, all parts of the body have their own functions, or actions peculiar to themselves. Life consists in the exercise of these functions, and health in the free and ready exercise of them.

FUNCTION, in algebra, denotes any compound quantity; and when one of the component quantities is variable, it is said to be a variable function. See the article QUANTITY.

Functions are formed either by addition, subtraction, multiplication, division, involution or evolution; as also by the resolution of equations. But besides these, which are called algebraical functions, there are others called transcendental, arising from the management of exponents, logarithms, &c.

For a farther account of functions, the reader may consult Bernoulli, Oper. T. 3. also Euler's Analys. Infinitor.

FUND, in anatomy, signifies the bottom of any cavity in the body; thus, the fund of the eye is that part possessed by the choroides and retina; the fund of the uterus, the fund of the bladder, &c. signify also the bottom of these parts. See the articles EYE and UTERUS.

FUND, in commerce, signifies the stocks of the great trading and monied companies.

FUNDS is also a term adopted by those who speak of the public revenue of nations, to signify the several taxes that have been laid upon merchandizes either by way of duties of custom, or excise, or in any other manner, to supply the exigencies of the state, and to pay interest for what sums it may have occasion to borrow. Thus we say, such a duty, or such a tax, is a good fund to answer such a purpose.

The funds or taxes of this kingdom, are either temporary or perpetual: temporary ones, are such as are either imposed for a certain number of years, or annually, as the land and malt-taxes: the perpetual funds, are such on which money has been borrowed for the public service, and which are appropriated for the secure and certain payment of the interest of such money, till the discharge of the principal so borrowed. See the articles DUTY, CUSTOM, TAX, &c.

FUNDAMENT, in anatomy, the same with anus. See the article ANUS.

FUNDAMENTAL, in general, something that serves as a base or foundation to another.

FUNDAMENTAL NOTE, in music, the principal note in a song, or composition, to which all the rest are in some measure adapted, and by which they are swayed: it is otherwise called the key to the song. See the articles KEY and CLEF.

FUNDAMENTO, in the italian music, every part that plays or sings the bass; but more especially the thorough bass, as being the foundation of all harmony.

FUNDI-BAY, that situated between New England and New Scotland, in which there is said to be an excellent fishery.

FUNEN, the second island for magnitude belonging to the king of Denmark, situated at the entrance of the Baltic sea, and separated from Jutland by the strait called the lesser Belt, and from the island of Zeland by the strait called the great Belt. Its chief town is Odensee.

FUNERAL RITES, ceremonies accompanying the interment or burial of any person. See the article BURIAL.

These rites differed among the antients according to the different genius and religion of each country. The Egyptians, among the rest of their funeral rites, embalmed their dead. See EMBALMING.

Among the antient Greeks it was usual sometimes, before the interment, to put a piece of money into the mouth of the deceased, which was thought to be Charon's fare for wafting the departed soul over the infernal river. This ceremony was not used in those countries which were supposed to be situated in the neighbourhood of the infernal regions, and to lead thither by a ready and direct road. The corpse was likewise furnished with a cake, composed of flour, honey, &c. which was designed to appease the fury of Cerberus, the door-keeper of hell, and to procure the ghost a safe and quiet entrance.

During the time the corpse continued in the house, there stood before the door a vessel of water, the design of which was, that those concerned about the body, might purify themselves by washing; it being the opinion of the Greeks, as well as of the Jews, that pollution was contracted by touching a dead body.

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The ceremonies by which they expressed their sorrow for the death of their friends, were various; but it seems to have been a constant rule to recede as much as possible in habit and behaviour from their ordinary customs. For this reason they abstained from banquets and entertainments; they divested themselves of all ornaments; they tore, cut off, or shaved their hair, which they cast into the funeral pile, to be consumed with the body of their deceased friend. Sometimes they threw themselves on the ground, and rolled in the dust, or covered their head with ashes; they beat their breasts, and even tore their flesh with their nails, upon the loss of a person they much lamented. When persons of rank, such as public magistrates, or great generals, died, the whole city put on a face of mourning: all public meetings were intermitted; the schools, baths, shops, temples, and all places of concourse, were shut up. See the article MOURNING.

Interring or laying the dead in the ground, seems to have been the most antient practice among the Greeks; tho' burning came afterwards to be generally used among them. It was customary to throw into the funeral pile those garments the deceased usually wore. The pile was lighted by one of the dead person's nearest relations or friends, who made prayers and vows to the winds to assist the flames, that the body might quickly be reduced to ashes; and during the time the pile was burning, the dead person's friends stood by it, pouring libations of wine, and calling upon the deceased. See the article BURNING.

When Numa reformed the religion of Rome, he ordered that the pontiffs should have the care of the funeral ceremonies; which, in most respects, were like those of the Greeks already described.

The funeral rites among the Hebrews, were solemn and magnificent: when any person was dead, his relations and friends rent their cloaths; which custom is but faintly imitated by the modern Jews, who only cut off a bit of their garment, in token of affliction. It was usual to bend the dead person's thumb into the hand, and fasten it in that posture with a string; because the thumb then having the figure of the name of God, they thought the devil would not dare to approach it. When they came to the burying place, they made a speech to the dead in the following terms: "Blessed be God, who has formed thee, fed thee, maintained thee, and taken away thy life. O dead! he knows your numbers, and shall one day restore your life, *&c.*" Then they spoke the elogium, or funeral oration, of the deceased; after which they said a prayer, called the righteousness of judgment; then turning the face of the deceased towards heaven, they called out, "Go in peace."

The ancient christians testified their abhorrence of the pagan custom of burning the dead; and always deposited the body entire in the ground: and it was usual to bestow the honour of embalming upon the martyrs, at least, if not upon others. They prepared the body for burial, by washing it with water, and dressing it in a funeral attire. The exportation, or carrying forth of the body, was performed by near relations, or persons of such dignity as the circumstances of the deceased required. Psalmody, or singing of psalms, was the great ceremony used in all funeral processions among the antient christians.

In the romish church, when a person is dead, they wash the body, and put a crucifix in its hand. At its feet stands a vessel full of holy-water, and a sprinkler, that they who come in may sprinkle both themselves and the deceased. In the mean time some priest stands by the corpse, and prays for the deceased till it is laid in the earth. In the funeral procession, the exorcist walks first, carrying the holy water; next the cross bearer, afterwards the rest of the clergy, and last of all the officiating priest. They also sing the *miserere*, and some other psalms; and at the end of each psalm a *requiem*. We learn from Alet's ritual, that the faces of deceased laymen must be turned towards the altar, when they are placed in the church; and those of the clergy, towards the people. The corpse is placed in the church surrounded with lighted tapers: after the office for the dead, mass is said; then the officiating priest sprinkles the corpse thrice with holy water, and as often throws incense on it. The body being laid in the grave, the friends and relations of the deceased sprinkle the grave with holy water.

The funeral ceremonies of the greek church, are much the same with those of the latin. It needs only be observed, that after the funeral service, they kiss the crucifix, and salute the mouth and fore-

forehead of the deceafed: after which each of the company eats a bit of bread, and drinks a glafs of wine in the church, wifhing the foul a good repofe, and the afflicted family all confolation.

FUNERAL COLUMN, a column crowned with an urn, wherein the afhes of fome deceafed perfon are fuppofed to be enclofed; the fuft or fhaft being befet with tears or flames, the fymbols of grief and immortality. See COLUMN.

FUNERAL GAMES, a part of the ceremony of the antient funerals.

It was cuftomary for perfons of quality, among the antient Greeks and Romans, to inftitute games with all forts of exercifes, to render the death of their friends more remarkable. This practice was generally received, and is frequently mentioned by antient writers. Patroclus's funeral games, take up the greateft part of one of Homer's iliads; and Agamemnon's ghoft is introduced by the fame poet in Odyff. ω, telling the ghoft of Achilles, that he had been a fpectator at a great number of fuch folemnities.

The celebration of thefe games among the Greeks, moftly confifted of horfe-races: the prizes were of different forts and value, according to the quality and magnificence of the perfon that celebrated them. The garlands, given to victors on this occafion, were ufually of parfly, which was thought to have fome particular relation to the dead.

Thofe games, among the Romans, confifted chiefly of proceffions; and fometimes of mortal combats of gladiators, around the funeral pile. They, as well as the Greeks, had alfo a cuftom, tho' very antient, of cutting the throats of a number of captives before the pile, as victims to appeafe the manes of the deceafed. Cæfar relates, that the Gauls had this cuftom.

The funeral games were abolifhed by the emperor Claudius.

FUNERAL ORATION, a difcourfe pronounced in praife of a perfon deceafed, at the ceremony of his funeral.

This cuftom is very ancient, both among the Greeks and Romans. Before the company departed from the fepulchre, they were often entertained with a panegyrick upon the dead perfon, always pronounced by a near relation, or one of the public magiftrates.

FUNGITÆ, in natural hiftory, a kind of foffile coral, of a conic figure, tho' fometimes flatted and ftriated longitudinally. See the article CORAL.

FUNGUS, in furgery, denotes any fpongy excrefcence. See EXCRESCENCE.

In wounds made by a fharp inftrument, where there is no indifpofition of body, the cure is generally performed without any interruption, but from the fungus; and here dry lint alone is generally the beft remedy through the whole courfe of dreffing. See ULCER and WOUND.

If ulcers produce a fpongy lax flefh, fprouting very high above the furface, it will be neceffary to deftroy it by fome of the efcharotics, or the knife. This fungus frequently approaches to a cancerous complexion, and when it rifes upon fome glands, fometimes actually degenerates into a cancer, as has happened in buboes of the groin. When excrefcences have arifen in venereal ulcers, efcharotics are to be preferred; and pulvis angelicus, which is a compofition of precipitate powder and burnt alum, as it eats deeper, is preferable to precipitate alone. When the excrefcence is cancerous, and does not arife from a large cancer, but only from the fkin itfelf, the actual cautery is ufually recommended; tho' it is a more fecure method to cut away quite underneath, and afterwards to drefs with eafy applications; but the cafes where either of thefe methods are practicable, very rarely occur.

A fungus in the joints, is a tumour in the articulations of the limbs, without heat or pain, and fo foft, that it eafily yields to the preffure of the finger; but upon its removal, expands itfelf immediately, without retaining any marks. This may be diftinguifhed from the dropfy of the joint, if it be obferved that the latter is a diftention of the entire joint, and the other arifes rather on one fide.

The moft proper method of cure, is to rub the part affected feveral times a-day with warm cloths, and then to foment it with the following decoction: take of litharge, half a pound; armenian bole, an ounce; maftich and myrrh, each half an ounce; wine vinegar, a pint: boil thefe together for a quarter of an hour. Ufe this decoction warm. See the article FOMENTATION.

If none of thefe medicines anfwer the purpofe, an incifion muft be made into the tumefied joint, towards the lower and moft commodious part, preffing the tumour

mour hard with your fingers, and retaining it with a bandage placed above it, to prevent its giving way. When the member is reſtored to its priſtine form, it may be healed by vulnerary balſams; but to prevent the ſerum from collecting again, purging and ſudorific medicines ſhould be given, and the wound be kept open with tents for ſome time. See WOUND.

FUNGUS, in botany, an order of vegetables, extremely different from all others, and belonging to the *cryptogamia* claſs of Linnæus.

The fungi have, indeed, ſo little of the common and general appearance of vegetables, that many have denied them to be ſuch, and contended for their being only excrementitious matter, protruded from decaying vegetables of other kinds. But notwithſtanding the fungi have neither the colour or texture of other plants, nor leaves nor flowers like them; yet they muſt be allowed to belong to the vegetable kingdom, as having abſolute and perfect ſeeds, conſiſting uſually of ſingle antheræ, which produce plants like thoſe from which they are collected.

The fungi are extremely different in figure, and in their manner and place of growth; ſome growing on the ground, ſome on living trees, and many on decayed wood; and that horizontally or erect. Some are of only a few days duration, others remain for years, and ſome there are which grow under the ſurface of the earth in no particular direction.

To the order of fungi belong a great many genera, as agaric, boletus, phallus, lycoperdon, *&c.* See AGARIC, *&c.*

FUNICULUS UMBILICALIS, the navel ſtring, in anatomy. See FOETUS and NAVEL.

FUNNEL *of a chimney*, the ſhaft or ſmalleſt part of the waſte, where it is gathered into its leaſt dimenſions.

Palladio directs, that the funnels of chimneys be carried through the roof four or five feet at leaſt, that they may carry the ſmoke clear from the houſe into the air. See the article CHIMNEY.

He alſo adviſes, that chamber-chimneys be not made narrower than ten or eleven inches, nor broader than fifteen; for if too narrow, the ſmoke will not be able to make its way; and, if too wide, the wind will drive it back into the room.

FUNNEL-FASHIONED, or FUNNEL-SHAPED-FLOWERS, in botany. See the article INFUNDIBULIFORM.

FUR, or FURR, in commerce. See FURR.

FURBISHER, a perſon who furbiſhes, poliſhes, or cleans arms, as guns, ſwords, piſtols, *&c.* which is chiefly performed with emery. See the article EMERY.

FURCA and FOSSA, in our old cuſtoms, the power of gallows and pit, or a juriſdiction of puniſhing felons, *viz.* the men by hanging, and the women by drowning.

FURCA, in antiquity, a piece of timber reſembling a fork, uſed by the Romans as an inſtrument of puniſhment.

The puniſhment of the furca was of three kinds: the firſt only ignominious, when a maſter, for ſmall offences, forced his ſervant to carry a furca on his ſhoulders about the city. The ſecond was penal, when the party was led about the circus, or other place, with the furca about his neck, and whipped all the way. The third was capital, when the malefactor, having his head faſtened to the furca, was whipped to death.

FURCAM ET FLAGELLUM, the meaneſt of all ſervile tenures, the bondman being at the lord's diſpoſal for life and limb.

FURCHE, in heraldry, a croſs forked at the ends. See the article CROSS.

FURFUR, BRAN. See the article BRAN.

From their reſemblance to bran, thoſe excrementitious particles which are evacuated with the urine, are alſo called furfures; and for the ſame reaſon this name is alſo given to the ſcabies or ſcurf of the head.

FURIES, *eumenides*, *diræ*, certain goddeſſes whoſe office it was to puniſh the guilty after death. Theſe were three in number; Alecto, Megæra, and Tiſiphone, who were deſcribed with ſnakes inſtead of hair, and eyes like lightening, carrying iron-chains and whips in one hand, and in the other flaming torches; the latter to diſcover, and the former to puniſh the guilty; and they were ſuppoſed to be conſtantly hovering over ſuch perſons as had been guilty of any enormous crime.

Mythologiſts ſuppoſe, that Tiſiphone puniſhed the crimes which ſprang from hatred or anger; Megæra, thoſe from envy; and Alecto, thoſe from an inſatiable purſuit after riches and pleaſure. They were worſhiped at Caſina in Arcadia, and at Carmia in Peloponneſus. They had a temple at Athens, near the Areopagus, and their prieſts were choſen from amongſt the judges of that court. At Telphuſia, a city in Arcadia, a black ewe was ſacrificed to them.

FURLING, in the sea-language, signifies the wrapping up and binding any sail close to the yard; which is done by hauling upon the clew-lines, bunt-lines, &c. which wraps the sail close together, and being bound fast to the yard, the sail is furled.

FURLING LINES, on ship-board, small lines made fast to the top sail, top gallant-sail, and the misen-yard-arms, to furl up the sails by.

FURLONG, a long measure, equal to $\frac{1}{8}$ of a mile, or forty poles. See the articles MEASURE, MILE, and POLE.

It is also used, in some law-books, for the eighth part of an acre. See the article ACRE.

FURLOUGH, in the military language, a licence granted by an officer to a soldier, to be absent for some time from his duty.

FURNACE, an utensil, or vessel, proper to contain fire; or to raise and maintain a vehement fire in, whether of coal or wood. See the article FIRE.

There are divers kinds of furnaces, of various forms, and for various purposes. A chemical furnace is a structure of brick, iron, or stone, capable of containing, restraining, and applying fire to vessels, wherein the chemical subjects are to receive the action of fire.

Hence a furnace requires, 1. A fire-place, wherein the fire is to be raised, kept up, and determined; and as artificial fire must be fed by fuel, a chimney becomes necessary to discharge the smoke; an ash-pit, to admit the air; and a door, where the fuel is to be thrown in. 2. In erecting a furnace, care must be taken to build it so as to preserve the strength of the fire, or not to waste it in vain; and this by directing it where it is particularly required. 3. A proper place must also be contrived, in which the vessels containing the subjects may receive the requisite degree of heat, for the requisite time to finish the operation.

In the building of furnaces, regard must be had, 1. To the quantity of fire which the fire-place ought to receive, contain, and support. 2. To the matter of the fuel to be used for the purpose. 3. To the degree of heat required in every operation; since in the same fire-place the same quantity of the same fuel may produce different degrees of heat. Whence, 4. The air must always have access to the fire place; and the force with which the air tends to the fire, under the form of wind or blast, should be computed. 5. The air-vent from the fire should be principally regarded, for if this be wide, the air here diffuses, and loses itself; or acts but little upon the subject, where its force ought to be collected.

The first or most simple chemical furnace, according to Boerhaave, is constructed as follows. Make a hollow box, with a square basis, of sound, dry oak, nine inches wide, and fourteen high. Into this fix a square piece of wainscot, one inch thick, and five inches from the basis, so as to divide the furnace into two parts; the lower whereof, being five inches high, serves for the fire-place; and the upper, eight inches high, is to receive the retort for distillation. This piece of wainscot, serving as a partition, must have a round hole in the middle, five inches over, where the round bottom of the vessel is to rest. Besides this large hole in the partition, there must be four other round holes made in it, each an inch in diameter, that the heat of the fire may rise freely from the fire place into the second story. On one side of the fire-place there must be a door going upon hinges, and equal in dimensions to the whole side, or nine inches broad, and five high, so as to open easy, and shut close. The whole internal fire surface of this fire-place must be lined with plated iron or copper, to defend the wood from the fire. The door is to have four round holes made in it, each of them an inch in diameter, to admit the external air; and these holes are to be fitted with four cylindrical stoppers, to regulate the fire, by admitting and excluding the air. This door must be made of seasoned wood, and made to shut extremely close. In the upper part of the furnace, the side above the door must have a square hole cut in the middle, to the top of it, four inches and a half over; the inner edge of which is to be cut away on its three sides to half the thickness of the board, or to the breadth of half an inch. And to the internal sloping surface about this hole, a plate of wood must be so fitted as to make a joint; this being of use to shut the side of the furnace close, when we design to distil, digest, or exhale in a cucurbit, phial, or evaporating glass: whereas the plate of wood being taken away, fits the furnace for distillation by the retort. There must also be another similar plate of wood with a hole in the middle, two inches

Fig. 1.

FULLING-MILL.

Fig. 2 CHEMICAL *FURNACES*.

N.o 1.

N.o 2.

N.o 3.

N.o 4.

Fig. 3. FUSIL.

T. Jefferys sculp.

inches and a half over, ſo as to let the neck of the retort paſs through it, when fitted into the ſquare hole, inſtead of the former. A pair of folding-doors ſhould alſo be made to ſerve as the flat top, or cover to the furnace; the middle part of which doors muſt be cut into a round hole of five inches diameter, to let out the neck of the cucurbit or bolt head, uſed in digeſtion. In the laſt place, there muſt be a round flat piece of wood, ſix inches in diameter, to cover this upper orifice, when the furnace is uſed for diſtilling by the retort. See a view of this furnace in plate CVIII. fig. 2. nº 1. In order to work this furnace, we muſt be provided with a ſquare flat-bottomed earthen pan, (*ibid.* A) ſtanding upon three feet, about half an inch high; the height of the pan being from the bottom of the furnace to its upper rim three inches and an half: at the bottom of this pan a little ſifted aſhes muſt be lightly ſprinkled, a quarter of an inch thick; then an ignited coal of dutch turf, firſt burnt till it yields no longer ſmoke, is to be laid upon this bed of aſhes, and covered by ſifting more of the ſame aſhes lightly upon it, whereby an equable, moderate heat may be kept up for near twenty-four hours.

This furnace works without yielding any ſmoke or diſagreeable ſmell, and affords ſo gentle and equable a heat, that in the opinion of Boerhaave, eggs may be hatched by it: tho' it may be raiſed high enough to make water boil, or higher; and of courſe will commodiouſly perform all kinds of digeſtions and diſtillations of aqueous and ſpirituous liquors, volatile alkaline ſalts, and volatile aromatic ſalts, or tinctures, exhalations, &c.

If a furnace be required capable of giving a ſtronger heat, ſo as to diſtil in ſand, the beſt contrivance, according to Boerhaave, is the following, for making portable furnaces, theſe being the moſt commodious, on account of leaving the chimney of the laboratory free. Let a hollow cylinder, C G H D, (*ibid.* nº 2.) be made of thin iron plate, ſeventeen inches in diameter, and nineteen inches high; the lower end to be cloſed, and the upper end open. Let the bottom be ſupported with three iron feet, twelve inches long; and let the iron bottom be covered on the inſide with a copper plate, leſt the ſalt in the aſhes ſhould otherwiſe ſoon corrode the iron. Let a grate, *y*, be fixed in this cylinder, ſo that the upper ſurface thereof, being parallel to the baſe of the cylinder, may riſe four inches above it. Let the grate be ſurrounded with a flat ring of plated iron, three inches and an half broad. Let the bars of the grate be flat, half an inch wide, and ſet at the diſtance of an inch from each other. This iron rim of the grate muſt reſt upon three pins ſticking out by the inſide of the furnace, to fix the grate. Let the aſh-place, N O P Q, be fitted with an iron door, four inches high, and ſix inches wide, to move upon hinges, and ſhut exactly cloſe. At the height of three inches from the upper ſurface of the grate, let the bottom of the fire-place, T R S V, begin, and make the whole ſix inches wide, and four inches and an half high.

Next deſcribe an ellipſis, I L M K, with the diſtance of fifteen inches between the foci, and a perpendicular of five inches from the focus to the circumference; and make a wooden model, *b c d e*, of half ſuch an ellipſis, cut off at the foci. This model is to ſerve as a core in forming the cavity of the furnace, by adjuſting fine brick-work in correſpondence to the figure made by revolving ſuch a model about its axis; and thus leaving but little ſpace between the joinings, to be exactly filled up with mortar. But before this is done, let a ſtopper be made for the fire-place of the ſame iron-plate, and the ſame cylindrical ſurface, and internal ſubſtance, as the furnace itſelf. The top of the cylindrical part of the furnace, K X I, muſt be cut into a hollow, three inches wide, and two deep, on the ſame ſide with the door, in order commodiouſly to receive the neck of the retort in diſtillation. Laſtly, an iron pot muſt be fitted into the upper opening of the furnace, K X I, and fixed ſo cloſe and ſtrong with brick and mortar, that the work may neither crack nor let the fire eſcape; but near the upper rim in this pot, there muſt be left in the brick-work four vent-holes, made in the form of creſcents, an inch over in their wideſt parts, and two inches in their curvature, to diſcharge the ſmoke, and make a draught of air to animate the fire occaſionally. And thus you will have a furnace fit for diſtilling by the cucurbit, retort, or bolt-head, and being portable, it will ſerve many other operations.

The third furnace, which no laboratory can be without, is a balneum mariæ, made

made like the two former, excepting that the diſtance from the ſurface of the grate to the bottom of the cylindrical copper-veſſel, is only eight inches. See the article BALNEUM.

A fourth furnace is alſo required in a laboratory, to raiſe a ſtrong fire for the melting of bodies not eaſily fuſed; the beſt furnace for which purpoſe, is made thus. Let a ſtone-arch, *a b c d*, (*ibid* n° 3.) be built three feet high, as a baſis whereon to raiſe this furnace; then make an aſh-hole, *c d e f*, five inches high; and over that fix a grate, *e f i h*, conſiſting of iron bars, near an inch thick, and ſet at about an inch diſtance from each other. Let the bottom of the grate, and the aſh-hole, be of a circular figure, twelve inches in diameter, *a b*, *c d*, *e f*, *h i*; and build up the cylinder ſix inches above the grate; then raiſe upon it a parabolic cone, *k m n l*, with an axis of eight inches, and its lower ordinate of ſix. Over this parabolic cone, build a cylindrical chimney of three inches diameter, and two feet high. In the front of the fire-place, two inches above the grate, make a door five inches wide, and ſix high, and arch it a-top with the arch of a circle, twelve inches in diameter. At the height of an inch above the arch of the door, make a conical hole in the furnace, two inches wide on the outſide, that the operator may look downwards into the fire when any thing is melting, and let a ſtopper be exactly fitted to this opening. The furnace, *a u y 4 b z x* 3, muſt be built with good brick and terras, and have its ſides five inches thick, the internal ſurface thereof being laid ſmooth with cement.

A fifth furnace, A B C D, (*ibid.* n° 5.) for diſtilling mineral acids, as thoſe of ſea-ſalt, nitre, alum, vitriol, *&c.* is directed by Boerhaave to be built in the following manner. Upon the pavement of the laboratory, under the chimney, build up a parallelopiped, twenty inches broad in front, A B, and twenty-eight inches long, B G. Let the cavity be twelve inches wide in front, and twenty-two inches long, which gives the thickneſs of the wall. Let the parallelopiped be raiſed eleven inches high. Make a door-way, H K L I, in the middle of the front, riſing eleven inches from the ground, and four inches wide, leaving an indenture on the front to receive an iron door; and let it cloſe occaſionally. This part of the apparatus regards the aſh-hole and air-vent of the furnace. Inſtead of a grate, here uſe priſmatic iron-bars, an inch wide, and fourteen inches long, placing them an inch aſunder, parallel with the breadth of the aſh-hole. Now deſcribe an ellipſis in the upper cavity upon this parallelopiped, with the foci twenty two inches aſunder, and the tranſverſe diameter twelve inches; whence the breadth of the fire-place will be at both ends about ten inches. Next let there be a cavity formed, of this elliptical figure, four inches and a half deep, on the inſide; and complete the external part of it in a parallelopiped-form. In the front-wall, immediately over the aſh-hole, make a door-way, P O M N, ſeven inches wide, and nine inches high; and let the bottom edge of this door-way ſlope an inch and a half downwards, and let the lower line of the door be three inches above the upper line of the aſh-hole. In the other ſide there muſt be an arched opening, R S Q, with its lower limit riſing ten inches above the grate, being twenty inches long, and twelve inches high; and the elliptical arch with its foci, twenty inches aſunder, and its tranſverſe diameter twenty-four. This opening is for the diſtilling veſſels to be put in and taken out. On the internal ſide, oppoſite to this opening, at the height of nine inches above the grate, a ledge of about an inch and a half muſt be left to ſupport the veſſels employed in the diſtillation; and in the middle of the upper part of this wall, there muſt be a ſquare hole, three inches wide, and two inches high, for the chimney. The upper elliptical arch muſt next be made, whoſe vertex is to riſe twenty-one inches above the grate, the axis of the ellipſis twenty-two inches, and the tranſverſe diameter ten. Let ſuch an arch therefore be ſtruck by revolving ſuch an ellipſis about its axis, reaching ſixteen inches from the grate.

When this furnace is uſed for diſtillation, two alembics are to be placed horizontally, and parallel to each other, ſo that their bottoms may reſt upon the ledge in the oppoſite wall, whilſt their mouths lie parallel to the opening they are put in at; which opening is now to be perfectly cloſed up with brick and mortar, leaving the necks of the veſſels ſticking

ſticking out, whereto earthen pipes being applied, and their other ends fixed to receivers, the operation may be thus begun. See the articles ALEMBIC and DISTILLATION.

For other chemical furnaces, ſee the article LABORATORY.

FURNACE is alſo applied to that uſed in the melting of iron, which authors frequently confound with iron-forges, tho' there is a conſiderable difference between them. See the article FORGE.

This furnace is a brick-ſtructure, much in the ſhape of an egg ſet on end, wherein the iron-ore, after it has been burnt in a kiln, is put, intermixed with cinders and charcoal, and the whole melted till it trickle down into the receiver underneath. See the article FLUX.

Swedenborg has laid down, from his own experience, certain rules for the conſtruction of metallurgic furnaces, by which they will always be made more advantageous to the proprietor, *cæteris paribus*, than any other kind. Theſe rules are, that the chimney be always placed as nearly as may be behind the center of the furnace; that the ſmaller the depth of the fire-place, provided it be ſufficient to hold the coals, the better; that all furnaces muſt be the better the wider they are forwards; and the higher they are, ſo as not to loſe the benefit of reverberation.

Bellows-FURNACE, is one of the two kinds of furnaces uſed in coinage for the fuſion of metals, conſiſting of a flat hearth at bottom, into which the air may be admitted by a hole, as in the chemical furnaces. On a level with the hearth is a ſecond aperture, which gives paſſage to the pipe of the bellows, from whence the furnace is denominated; about a foot over this is a moveable grate; and over this is the place where the crucible is ſet, which is ſquare, and made of the ſame earth with the crucible, of breadth ſufficient to bear a range of coals around the crucible. To melt metal in this furnace, they lay a little plate of forged iron over the grate, and on this they ſet the crucible, which is likewiſe covered with an iron or earthen lid; then they fill the furnace with charcoal, and when it is well lighted, and the crucible ſufficiently hot, they ſtop the vent-hole: laſtly, throwing on freſh coals, they ſtop the furnace with an iron lid; thus continuing to work the bellows, and ſupply freſh fuel, till the metal is in fuſion.

Domeſtic FURNACE. See OVEN.

Founder's FURNACE. See FOUNDERY.

Glaſs-houſe FURNACE. See GLASS.

Glaſs-painter's FURNACE is made of brick, nearly ſquare, and about 2 ½ feet each way. It is cut horizontally in the middle by a grate, which ſuſtains the pan or ſhovel the glaſs is baked in. This furnace has two apertures, one below the grate, to put the fuel in at; the other above it, through which the workman ſpies how the action of the colours goes on.

Hatter's FURNACES are of three kinds: a little one under the mould, whereon they form their hats; a larger in the ſcouring-room, under a little copper, full of lees; and a very large one under the great copper, wherein they dye their hats.

Plumber's FURNACE is alſo of three kinds. In the firſt they melt the lead whereof the ſheets are to be caſt, being only a large copper, or receptacle like a copper, made of free-ſtone, and coated well round with potter's clay, having a little iron-pan at bottom.

In the ſecond they melt the lead to be caſt in moulds for pipes, &c. which are not to be ſoldered.

The third is the tinning furnace, being a ſquare frame of wood, or ſometimes a maſs of ſtone work, with a brick-hearth whereon is made a charcoal fire, which ſerves them for the applying of thin tin leaves on their works.

Wind FURNACE, the ſecond furnace uſed in the fuſion of metals for coinage. At bottom it has a hearth made hollow, in manner of a copel, with a vent-hole in the forepart thereof; over the vent-hole is a grate, ſealed in the maſſive of the furnace; over the grate is the place for the crucible, which is uſually of forged iron. The fire being lighted, the crucible is put in, with a cover over it, and a capital or cover of earth or iron, is laid likewiſe over the furnace; and at the top of this capital is a hole, five or ſix inches in diameter. This is called a wind-furnace, by reaſon the air entering thro' the vent-hole at bottom, which is always open, ſerves the ſame purpoſe as the bellows in the other furnaces. Gold is generally melted in the bellows furnace, as requiring an intenſer heat before it fuſes; but ſilver and copper are commonly melted in the wind-furnace.

FURNAGE, or FORNAGE. See the article FORNAGE.

FURNES, a town of Flanders, ten miles east of Dunkirk: east long. 2° 25′, and north lat. 51° 10′.

FURNITURE *of dials*, certain additional points and lines, such as the ecliptic, circles of declination, azimuths, italian hours, points of the compass, *&c.* drawn on dial-plates. See the article DIAL.

FURO, in zoology, a name given to the viverra, or ferret. See FERRET.

FUROR UTERINUS, a disorder peculiar to women, proceeding from an inordinate desire of coition, sometimes attended with melancholy, and sometimes with a maniacal delirium. The patient delights in talking obscenely, and in soliciting men to satisfy their desires both by words and gestures.

It is occasioned by an inflammation of the pudenda, or of the parts in which the venereal stimulus resides, which are chiefly the clitoris and vagina; or in the too great abundance and acrimony of the fluids of those parts; or both these causes may exist together.

In the delirium maniacum, the patient is entirely shameless; but in the melancholicum more reserved, and her folly is confined to fewer objects. If it continues a month or two, the fault of the brain becomes obstinate, for it degenerates into real madness.

The indications of cure are to diminish the heat and sensibility of the affected parts, to cool, sweeten, and dilute the blood, and so render it balsamic; or to pursue both intentions at once. The first indication is answered by frequent and copious bleeding: she must likewise be purged with jalap, scammony, or diagridium. Emetics are also good; and emollient clysters should be given; to which add a dram and a half of sal prunella, or a little vinegar, morning and night. To abate the acrimony, the patient may drink mineral waters, or emulsions with chicken-broth, and seeds of papav. alb. lin. cannabis, *&c.* and sweetened. In the summer, whey with half a drachm of sal prunel. for each dose. After which she should be kept to a milk diet only.

In a delirium melancholicum, lawful coition may be admitted.

FURR, in commerce, signifies the skin of several wild beasts, dressed in alum with the hair on, and used as a part of dress by princes, magistrates, and others. The kinds most in use are those of the ermine, sable, castor, hare, coney, *&c.* See the articles ERMINE, SABLE, *&c.*

Furrs are charged with various duties. Badger-skins pay, the piece, $5\frac{74\frac{1}{2}}{100}$d. whereof $5\frac{17\frac{1}{2}}{100}$d. is drawn back on exportation. Bear-skins, if black or red, pay each 4 s. $9\frac{45}{100}$d. and draw back 4 s. $3\frac{75}{100}$d. but if white, each skin pays 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{50}{100}$d. Beaver skins pay each $7\frac{18\frac{1}{8}}{100}$d. and draw back $4\frac{34\frac{2}{16}}{100}$d. Cats-skins, the hundred, containing five score, pays 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{70}{100}$d. Ermines, the timber, containing forty skins, pay 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{1}{2}$ d. Fox-skins, the ordinary kind, pay only $3\frac{87}{100}$d. each, and draw back $3\frac{45}{100}$d. but each black fox skin pays 2 l. 7 s. $10\frac{50}{100}$d. and draws back 2 l. 3 s. $1\frac{50}{100}$d. Leopard-skins, the piece, pay 5 s. $11\frac{81\frac{1}{4}}{100}$d. and draw back 5 s. $4\frac{68\frac{3}{4}}{100}$d. Matrons, the timber, containing forty skins, pay 2 l. 7 s $10\frac{50}{100}$d. and draw back 2 l. 3 s. $1\frac{50}{100}$d. Mole-skins, the dozen, pay $1\frac{43\frac{5}{8}}{100}$d. and draw back $1\frac{29\frac{3}{8}}{100}$d. Otter-skins, the piece, pay 1 s. $2\frac{36\frac{1}{4}}{100}$d. and draw back 1 s. $\frac{93\frac{3}{4}}{100}$d. Ounce-skins, the piece, pay 2 s. $11\frac{00\frac{5}{8}}{100}$d. and draw back 2 s. $8\frac{34\frac{3}{8}}{100}$d. Sables of all sorts, the timber, containing forty skins, pay 7 l. 3 s. $7\frac{50}{100}$d. and draw back 6 l. 9 s. $4\frac{50}{100}$d. Weazle skins, the dozen, pay $\frac{95\frac{3}{4}}{100}$d. and draw back $\frac{86\frac{1}{4}}{100}$d. Wolf-skins tawed, the piece, pay 7 s. $2\frac{17\frac{1}{2}}{100}$d. and draw back 6 s. $5\frac{62\frac{1}{2}}{100}$d. Wolf-skins untawed, the piece, pay 5 s. $6\frac{6\frac{3}{4}}{100}$d. and draw back 4 s. $11\frac{51\frac{1}{4}}{100}$. If any furrs be tawed, or otherwise dressed, they pay 6 s. more for every 20 s. value.

FURRS,

FURRS, in heraldry, a bearing which represents the skins of certain beasts, used as well in the doubling of the mantles belonging to the coat-armour, as in the coat-armours themselves. See the articles ERMIN, ERMINOIS, &c.

FURR, among carpenters, a piece nailed upon a rafter, to strengthen it when decayed, or to make it straight when it has sunk in the middle.

FURRING, among carpenters, is the regular fashioning out any part. When the main piece of the material is scanty, either by defects, wains, or want of thickness; then a piece of the same is put behind it to make good its thickness, which is called a furr.

FURSTENBURG, a town and castle of Germany, the capital of a county of the same name, thirty miles north-west of Constance: east long. 8° 30′, and north lat. 47° 50′.

FURSTENFIELD, a town of Austria and dutchy of Stiria, thirty-six miles east of Gratz: east long. 16° 46′, and north lat. 47° 26′.

FURUNCLE, or BOIL, in surgery, a small resisting tumour, with inflammation, redness, and great pain, arising in the adipose membrane, under the skin.

As there is no part of the body free from being the subject of furuncles, so the whole is sometimes so miserably infested with them, that the patient can hardly tell how to stir himself, or on what part to lie. Not only adults, but also the younger, even new-born infants, are obnoxious to this dreadful disorder, which occasions in them most fatiguing clamour and restlessness. Though there is little danger in this disease in adults; yet, in tender infants, it occasions convulsions, and even death itself.

The principal cause of furuncles is a too glutinous and inspissated state of the blood; and, consequently, the greater the inspissation, the worse and more numerous will be the furuncles.

With regard to the cure, it seems to consist chiefly in restoring the stagnating blood to its former circulation and free motion.

When the furuncles are very numerous, or return again, it is proper to use internal purging medicines, and such as attenuate and cleanse the blood. In adults, bleeding is proper, both by the lancet and scarification with cupping; and, at the same time, a strict regimen of diet should be used, drinking frequently and plentifully of a decoction of the woods, and such like attenuators of the blood. The patient should also entirely abstain from drinking fermented and spirituous liquors, particularly wine and its spirit; and from the too frequent use of tobacco. When the disorder is recent, external medicines only will frequently suffice for the whole cure. For this purpose a mixture of honey, acidulated with spirit of vitriol till it has acquired a considerable sharpness, is proper to anoint the furuncles. Of no less virtue is the frequent touching them with mere spirit of vitriol or sulphur. Discutient plasters are also found very serviceable, as those of simple diachylon, de melito, de sperma ceti, vel diasaponis.

But if these medicines prove insufficient to disperse the tumour, it is to be brought to suppuration, by applying a plaster made of honey and flour, or of diachylon with the gums; and where these are insufficient, to make use of the maturating cataplasms recommended under the article PHLEGMON.

When the furuncle is known to be ripe, by its softness and yellow head, recourse is to be directly had to the scalpel; and having made an opening, the corrupted matter contained therein is to be discharged: after this, a plaster of diachylon must be applied, and the ulcer daily cleansed of its matter, till it is healed.

Pustules and pimples arising in the face, are to be treated like furuncles; and, in both cases, the drinking of whey, and the mineral waters, is accounted good for cleansing the blood.

When sucking infants are afflicted with furuncles, it is proper to give the mother, or nurse, some purging medicine, and to order a strict regimen and diet. At the same time the infant should take some gentle laxative medicine, with absorbent powders, to allay the acrimony of its juices.

FURUNCULUS, in zoology, a name given to the ferret. See the article FERRET.

FURZE, or FURZE-BUSH, in botany. See the article ULEX.

In many countries, where there are dry banks, or dry sand or gravel, that nothing else will grow on, furse makes an extremely good fence; and is propagated either by sets or seeds, especially the latter. It will make a good hedge in three years, if well weeded and carefully kept from cattle, especially sheep; and if clipped, it will thrive extremely, and be

very thick; but if let grow at large, it will prove the better ſhelter, and yield excellent fuel. It proves alſo an admirable covert for wild-fowl.

Sometimes, indeed, furze over-runs the paſture, or arable-lands; in which caſe it is to be grubbed up, or it may be deſtroyed by only marling the lands.

Furze faggots are uſed for breeming ſhips, when in the dock to be cleaned, or under repair.

FUSAROLE, in architecture, a moulding or ornament placed immediately under the echinus, in the doric, ionic, and compoſite capitals.

It is a round member carved in the manner of a collar, or chaplet, with oval beads; and ſhould always anſwer exactly under the eye of the volute, in the ionic capital.

FUSEE, in clock-work, is that conical part drawn by the ſpring, and about which the chain or ſtring is wound; for the uſe of which, ſee the articles CLOCK and WATCH.

FUSEE, or FIRELOCK. See the article MUSQUET.

FUSEE *of a bomb*. See the article BOMB.

FUSIBILITY, in natural philoſophy, that quality of bodies, which renders them fuſible. See the article FUSION.

FUSIBLE COLUMN. See COLUMN.

FUSIL, in heraldry, a bearing of a rhomboidal figure, longer than the lozenge, and having its upper and lower angles more acute and ſharp than the other two in the middle. It is called in latin *fuſus*, a ſpindle, from its ſhape. See plate CVIII. fig. 3.

FUSILIERS, or FUSILEERS, in the military art, are foot-ſoldiers, armed with fuſees, or firelocks. See FUSEE.

FUSILY, or FUSILE', in heraldry, ſignifies a field, or ordinary, entirely covered over with, or divided into fuſils. See the article FUSIL.

FUSION, the melting of metals, minerals, &c. by means of fire.

Different metals run in different manners from their ores: thus, lead, though extremely fuſible in the metal, runs with difficulty from the ore, ſo as to require a conſiderable violence of fire. This ſtubbornneſs not belonging to the metal, muſt be attributed to the ſtony, ſulphureous, or other mineral matter with which the ore is mixed; which matter ſeems to require a degree of heat capable of vitrifying the lead, before the metal will run; but then the lead thus vitrified, recovers a metallic form again, by coming in contact with the coals. See LEAD.

Tin runs from its ore with greater eaſe than lead, and is therefore ſmelted in much leſs furnaces: but copper requires an intenſe heat, or a blaſt furnace; and iron the greateſt heat that can be given in a furnace: and both iron and copper abſolutely require immediate contact with the fuel employed. Hence it appears that each metal muſt have its determinate degree of heat, to run it with advantage from the ore or ſtone.

In order, likewiſe, to obtain the metal from the ore to the beſt advantage, the ſcoria or ſlag muſt be neceſſarily made to run thin and fluid; otherwiſe it entangles or inviſcates the metal, and will not let it ſeparate fully. And hence we frequently obſerve in the aſſaying of copper-ores, ſmall grains of metal interſperſed here and there, among the ſcoria, that require to be ſeparated by ſtamping and waſhing the whole maſs; which labour might have been prevented, by uſing a proper degree of heat capable of procuring a thin fuſion and a ſuitable flux, ſo as to have made all the metals fall to the bottom of the crucible; which it conſtantly does, when the operation is well performed. See FLUX.

It ſeems principally owing to a defect in the knowledge of fuſion, that ſo many recrements or ſlags of metals, antiently thrown as uſeleſs from the furnace, have been of late wrought to conſiderable profit by more ſkilful workmen: at leaſt it ſeems more rational to attribute the ſucceſs to this cauſe, than to a ſuppoſed growth of metals in ſuch ſlags; or to believe that lead has grown rich in ſilver by lying expoſed to the open air, while perhaps it is rather owing to the unſkilfulneſs of the former workmen, who were unable to ſeparate all the ſilver contained in the lead.

All moiſture, and too ſudden cooling, prove prejudicial to the more ignoble metals after fuſion, and ſometimes dangerous to the operator: for a little water falling upon melted iron or copper, makes them expand with prodigious violence, and diſcharge themſelves abroad with a force like that of a cannon: and even ſudden cooling will often occaſion the ſurface of the metal to crack, and ſuffer the more internal part, not yet ſet or fixed, to iſſue out to a conſiderable diſtance; whence either the loſs of the metal or miſchief may enſue.

To

To prevent these ill effects, after copellation it is usual for the operator to throw a quantity of water, all at once, upon the lump of silver, as it lies in the test, at the moment when it begins to grow rigid; for the water, by its coldness, suddenly makes so thick a cover upon the surface of the silver, that the hotter parts in the inside cannot break thro' the upper.

For the manner of making steel by fusion, see the article STEEL.

FUST, the same with the shaft of a column. See COLUMN and SHAFT.

FUSTIAN, in commerce, a kind of cotton stuff, which seems as it were whaled on one side.

Right fustians should be altogether made of cotton-yarn, both woof and warp; but a great many are made, of which the warp is flax, or even hemp.

There are fustians made of several kinds, wide, narrow, fine, coarse; with shag or nap, and without it.

The duties on fustians imported, are so high as to amount in a manner to a prohibition: for instance, dutch and milan fustians, the piece, containing two half pieces of fifteen yards the half piece, pay 1 l. 10 s. $9\frac{60}{100}$ d. draw back 1 l. 7 s. Holmes and bevernex fustians, the bale, containing forty-five half pieces, pay 15 l. 8 s. draw back 13 l. 10 s. Naples fustians, tripe or velure plain, the yard, pay 1 s. $11\frac{10}{100}$ d. draw back 1 s. $8\frac{25}{100}$ d. Naples fustians, wrought, called sparta velvet, the yard pay 3 s. $\frac{96}{100}$ d. draw back 2 s. $8\frac{40}{100}$ d.

FUSTICK, or FUSTOCK, a yellow wood, that grows in all the Caribbee-islands, used in dying yellow.

It pays no duty on importation.

FUTTOCKS, in a ship, the timbers raised over the keel, or the encompassing-timbers that make her breadth. Of these there are first, second, third, and fourth, denominated according to their distance from the keel, those next it being called first or ground-futtocks, and the others upper-futtocks: those timbers, being put together, make a frame-bend.

FUTURE, in general, denotes whatever regards futurity, or the time to come. See the article TIME.

FUTURE TENSE, among grammarians. See the article TENSE.

FUZEE, or FUSEE, in military affairs. See the article FUSEE.

FUZEE, among farriers, two dangerous splents, joining from above downwards. They differ from screws or thorough splents in this, that the latter are placed on two opposite sides of the leg. See the article SPLENT.

FUZILIER, or FUSILIER, in the art of war. See the article FUSILIERS.

G.

G, in grammar, the seventh letter and fifth consonant of our alphabet; but in the greek, and all the oriental languages, it occupies the third place. It is one of the mutes, and cannot be sounded without the assistance of some vowel. Its sound is formed by shutting the teeth gently together, so as scarce to touch, by a small incurvation of the sides of the tongue upwards, with the top touching the palate, at the same time that the breath is pretty strongly pressed through the lips a little opened.

In english it has a hard and soft sound; hard, as in the word *game*, *gun*, *&c.* and soft, as in the word *gesture*, *giant*, *&c.* at the end of words, *gh* is pronounced like *ff*, as in the words *rough*, *tough*, *&c.* The letter *g* is also used in many words where the sound is not perceived, as in *sign*, *reign*, *&c.*

As a numeral, G was antiently used to denote 400; and with a dash over it, thus $\overline{G}$, 400,000. In music it is the character or mark of the treble cleff; and from its being placed at the head, or marking the first sound in Guido's scale, the whole scale took the name gamut. See the article CLEF and GAMUT.

As an abbreviature, G. stands for Gaius, Gellius, gens, genius, *&c.* G. G. for gemina, gessit, gesserunt, *&c.* G. C. for genio civitatis, or Cæsaris. G. L. for Gaius libertus, or genio loci. G. V. S. for genio urbis sacrum. G. B. for genio bono. And G. T. for genio tutelari.

GABARA, or GABBARA, in antiquity, the dead bodies which the Egyptians embalmed, and kept in their houses, especially those of such of their friends as died with the reputation of great piety and holiness, or as martyrs. See the articles EMBALMING and MUMMY.

GABEL, a word met with in old records, signifying a tax, rent, custom, or service, paid to the king, or other lord.

GABEL, or GAVEL, among builders. See the article GAVEL.

GABEL, according to the french duties or customs, a tax upon salt, which makes the second article in the king's revenue, and amounts to about one fourth part of the whole revenue of the kingdom.

GABIN, a town of Great Poland, forty-six miles north west of Warsaw; east long. 20°, and north lat. 52° 35′.

GABIONS, in fortification, baskets made of ozier twigs, of a cylindrical form, six feet high and four wide; which being filled with earth, serve as a shelter from the enemies fire.

They are commonly used on batteries, to screen the engineers, &c. in order to which, one is placed on either side of each gun, room being only left for the muzzle to appear through. They also serve as a parapet on lines, lodgements, &c. when the ground is too hard to dig into. There are a smaller sort, used on parapets in trenches, &c. to cover the musqueteers; which are placed so close, that a musquet can just peep through.

To render the gabions useless, the enemy endeavours to set them on fire, by throwing pitched faggots among them.

GABLE, or GAVEL, among builders. See the article GAVEL.

GABLOCKS, the artificial spurs of game-cocks. See the article GAME-COCK.

GABRES, or GAURS, in the religious customs of Persia. See GAURS.

GAD, among miners, a small punch of iron, with a long wooden handle, used to break up the ore.

One of the miners holds this in his hand, directing the point to a proper place, while the other drives it into the vein, by striking it with a sledge hammer.

GAD-FLY, or BREEZE-FLY, names given to the black and yellow bodied oestrus, a fly nearly as large as the common blue flesh-fly. See the article OESTRUS.

GADUS, in ichthyology, a genus of malacopterygious fishes, the head of which is usually compressed; the branchiostege membrane on each side contains six small bones; and the back-fins are either two or three in number.

This is a large genus, comprehending the whiting, cod, haddock, ling, whistle-fish, &c. See WHITING, COD, &c.

GADWAL, in ornithology, a species of duck, about the size of a widgeon. See the article DUCK.

GAFOLD LAND, in old law-books, land liable to taxes, and let for rent.

GAGATES, JET, in natural histtorry. See the article JET.

GAGE, in law-books, the same with surety of pledge. See the articles SURETY and PLEDGE.

Thus, where a person has taken distress, and being sued in replevin, he shall not only avow the distress, but gager deliverance; that is, put in sureties, or pledges, that he will deliver them. See the article DISTRESS.

GAGE is also used in a synonymous sense with wage. See the article WAGE.

Mort-GAGE. See MORTGAGE.

GAGE, in the sea-language. When one ship is to windward of another, she is said to have the weather-gage of her. They likewise call the number of feet that a vessel sinks in the water, the ship's gage; this they find by driving a nail into a pike near the end, and putting it down beside the rudder till the nail catch hold under it; then as many feet as the pike is under water, is the ship's gage.

GAGE, in joinery, an instrument marked G, in Plate of Joinery, in which the piece of wood *b*, is moveable upon the staff *c*, so as to be set nearer or farther from the tooth *a*, at pleasure. Its use is to draw a line parallel to the straight side of any board, for gaging tenons, and marking stuff to an equal thickness.

GAGE, among letter-founders, a piece of box, or other hard-wood, variously notched; the use of which is to adjust the dimensions, slopes, &c. of the different sorts of letters. See the article FOUNDERY and LETTER.

There are several kinds of these gages, as the flat-gage, represented in plate CIX. fig. 1. n° 3. and the face gage and italic-gage, &c. *ibid.* n° 5.

Sliding-GAGE, a tool used by mathematical instrument makers, for measuring and setting off distances. It is also of use in letter-cutting, and making of moulds. See plate CIX. fig. 1. n° 4. where *aa* is the beam, *b* the tooth, *cc* the sliding socket, and *dddd* the shoulder of the socket.

Sea-

Sea-GAGE, an inftrument invented by Dr. Hales and Dr. Defaguliers, for finding the depth of the fea, the defcription whereof is this. A B (plate CIX. fig. 1. nº 1.) is the gage bottle, in which is cemented the gage-tube F *f*, in the brafs-cap at G. The upper end of the tube F, is hermetically fealed, and the open lower end *f*, is immerfed in mercury, marked C, on which fwims a fmall thicknefs or furface of treacle. On the top of the bottle is fcrewed a tube of brafs H G, pierced with feveral holes, to admit the water into the bottle A B. The body K, is a weight, hanging by its fhank L, in a focket N, with a notch on one fide at *m*, in which is fixed the catch *l* of the fpring S, and paffing through the hole L, in the fhank of the weight K, prevents its falling out, when once hung on. On the top, in the upper part of the brafs-tube at H, is fixed a large empty ball, or full-blown bladder I, which muft not be fo large, but that the weight K may be able to fink the whole under water.

The inftrument, thus conftructed, is ufed in the following manner. The weight K being hung on, the gage is let fall into deep water, and finks to the bottom; the focket N, is fomewhat longer than the fhank L, and therefore, after the weight K comes to the bottom, the gage will continue to defcend, till the lower part of the focket ftrikes againft the weight; this gives liberty to the catch to fly out of the hole L, and let go the weight K; when this is done, the ball or bladder I, inftantly buoys up the gage to the top of the water. While the gage is under water, the water having free accefs to the treacle and mercury in the bottle, will by its preffure force it up into the tube F *f*, and the height to which it has been forced by the greateft preffure, *viz.* that at the bottom, will be fhewn by the mark in the tube which the treacle leaves behind it, and which is the only ufe of the treacle. This fhews into what fpace the whole air in the tube F *f* is compreffed; and confequently the height or depth of the water, which by its weight produced that compreffion, which is the thing required.

If the gage-tube F *f*, be of glafs, a fcale might be drawn on it with the point of a diamond, fhewing, by infpection, what height the water ftands above the bottom. But the length of 10 inches is not fufficient for fathoming depths at fea, fince that, when all the air in fuch a length of tube is compreffed into half an inch, the depth of water is not more than 634 feet, which is not half a quarter of a mile.

If, to remedy this, we make ufe of a tube 50 inches long, which for ftrength may be a mufquet-barrel, and fuppofe the air compreffed into an hundredth part of half an inch; then by faying as 1 : 99 : : 400 : 39600 inches, or 3300 feet; even this is but little more than half a mile, or 2640 feet. But fince it is reafonable to fuppofe the cavities of the fea bear fome proportion to the mountainous parts of the land, fome of which are more than three miles above the earth's furface; therefore, to explore fuch great depths, the Dr. contrived a new form for his fea-gage, or rather for the gage-tube in it, as follows: B C D F (*ibid.* nº 2.) is a hollow metalline globe communicating on the top with a long tube A B, whofe capacity is a ninth part of that globe. On the lower part at D, it has alfo a fhort tube D E, to ftand in the mercury and treacle. The air contained in the compound gage-tube is compreffed by the water, as before; but the degree of compreffion, or height to which the treacle has been forced, cannot here be feen thro' the tube; therefore, to anfwer that end, a flender rod of metal or wood, with a knob on the top of the tube A B, will receive the mark of the treacle, and fhew it, when taken out.

If the tube A B be 50 inches long, and of fuch a bore that every inch in length fhould be a cubic inch of air, and the contents of the globe and tube together 500 cubic inches; then, when the air is compreffed within an hundredth part of the whole, it is evident the treacle will not approach nearer than five inches of the top of the tube, which will agree to the depth of 3300 feet of water as above. Twice this depth will comprefs the air into half that fpace nearly, *viz.* $2\frac{1}{2}$ inches; which correfpond to 6600 which is a mile and a quarter. Again, half that fpace, or $1\frac{1}{4}$ inch, will fhew double the former depth *viz.* 13200 feet, or $2\frac{1}{2}$ miles, which is probably very nearly the greateft depth of the fea.

Bucket-fea-GAGE, an inftrument contrived by Dr. Hales, to find the different degrees of coolnefs and faltnefs of the fea, at different depths; confifting of a common houfhold

houſhold pail or bucket, with two heads to it. Theſe heads have each a round hole in the middle, near four inches diameter, and covered with valves opening upwards; and that they might both open and ſhut together, there is a ſmall iron-rod fixed to the upper part of the lower valve, and at the other end to the under part of the upper valve; ſo that as the bucket deſcends with its ſinking weight into the ſea, both the valves open by the force of the water, which by that means has a free paſſage through the bucket. But when the bucket is drawn up, then both the valves ſhut by the force of the water at the upper part of the bucket; ſo that the bucket is brought up full of the loweſt ſea-water to which it had deſcended.

When the bucket is drawn up, the mercurial thermometer, fixed in it, is examined; but great care muſt be taken to obſerve the degree at which the mercury ſtands, before the lower part of the thermometer is taken out of the water in the bucket, elſe it would be altered by the different temperature of the air.

In order to keep the bucket in a right poſition, there are four cords fixed to it, reaching about four feet below it, to which the ſinking weight is fixed.

Water-GAGE, or HYDROMETER. See the article HYDROMETER.

GAGES *for grinding optic glaſſes.* See the article GRINDING.

GAGER and GAGING. See the articles GAUGER and GAUGING.

GAIANITES, *gaianitæ*, in church-hiſtory, a branch of eutychians. See the article EUTYCHIANS.

GAIETA, a ſtrong fortified town of the kingdom of Naples, in Italy, thirty-five miles north-weſt of the city of Naples: eaſt longitude 14° 30′. and north latitude 41° 20′.

GAIN, in architecture, the bevelling ſhoulder of a joiſt or other timber.

It is alſo uſed for the lapping of the end of the joints, *&c.* upon a trimmer or girder, and then the thickneſs of the ſhoulder is cut into the trimmer, alſo bevelling upwards, that it may juſt receive the gain, and ſo the joiſt and trimmer lie even and level with the ſurface.

This way of working is uſed in floors and hearths.

GAINAGE, in old law-books, properly ſignifies the plough-tackle, or implements of huſbandry; but is alſo uſed for the gain or crop of ploughed lands.

GAINSBOROUGH, a market-town of Lincolnſhire, fourteen miles north-weſt of Lincoln; which gives the title of earl to the noble family of Noel.

GAIOPHRAGMIA, in natural hiſtory, a genus of ſeptariæ, divided by ſepta or partitions of earthy matter, of which there are ſeveral ſpecies. See SEPTARIÆ.

GALACTITES, in natural hiſtory, the name by which the antients called a ſmooth, aſh-coloured, indurated kind of clay, ſaid to have been uſed with ſucceſs for defluxions and ulcers of the eyes, and as an aſtringent. See the article CLAY.

GALANGALS, *galanga*, in the materia medica, the name of two roots kept in the ſhops, a greater and a ſmaller; of which the ſmaller is by far moſt eſteemed.

The leſſer galangal is a ſmall and ſhort root, of an irregular figure, and of the thickneſs of a man's little finger, ſeldom met with more than an inch or two long. It ſhould be choſen full and plump, of a bright colour, very firm and ſound, and of an acrid and inſupportably hot taſte.

The larger galangal is brought to us in pieces of two inches or a little more in length, and of near an inch in thickneſs: its ſurface is leſs unequal and tuberoſe than the ſmaller ſort, but is far from being ſmooth; on the outſide it is of a brown colour, with a very faint caſt of red, and within it is of a paler colour, and has a much leſs acrid and pungent taſte than the ſmaller kind. It is to be choſen in the largeſt, ſoundeſt, and heavieſt pieces.

The roots of both the galangals, but particularly of the leſſer, abound with a volatile, oily, aromatic ſalt; the leſſer is eſteemed an excellent ſtomachic: it has the credit of being a great cephalic, cardiac, and uterine, but is more particularly recommended in vertigos. The greater galangal poſſeſſes the ſame virtues, but in a leſs degree. See the article KÆMPFERIA.

GALANTHUS, the SNOW-DROP, in botany, a genus of the hexandria-monogynia claſs of plants, the flower of which conſiſts of three oblong and obtuſe petals; the fruit is a globoſo-oval capſule, obtuſely trigonal, and containing a great number of roundiſh ſeeds.

The galanthus is the ſame with the narciſſo-leucoium of authors, with a large ſnow-white flower.

GALATA, a great ſuburb belonging to Con-

Conſtantinople, oppoſite to the ſeraglio, on the other ſide of the harbour. It is here that the Greeks, Armenians, Franks, Chriſtians, and Jews inhabit, and are allowed the exerciſe of their reſpective worſhips.

GALATIA, the antient name of Amaſia, a province of Leſſer Aſia.

GALATIANS, or *Epiſtle to the* GALATIANS. See the article EPISTLE.

GALAX, in botany, a genus of the pentandria monogynia claſs of plants, the calyx of which conſiſts of a ten leafed perianthium: the corolla conſiſts of a ſingle bowl faſhioned petal; the fruit is an oval coloured elaſtic capſule, with one cell, containing two large, convex, and callous ſeeds.

GALAXY, in aſtronomy, the via lactea, or milky way in the heavens: a tract of a whitiſh colour, and conſiderable breadth, which runs through a great compaſs of the heavens, ſometimes in a double, but for the greateſt part of its courſe in a ſingle ſtream; and is compoſed of a vaſt number of ſtars, too minute or too remote from the earth, to be diſtinguiſhed by the naked eye; but are diſcovered in all parts of it, in great numbers, by the aſſiſtance of the teleſcope.

GALBANUM, in pharmacy, a gum iſſuing from the ſtem of an umbelliferous plant, growing in Perſia and many parts of Africa.

It is ſometimes met with in the ſhops in looſe granules, called drops or tears, and ſometimes in large maſſes, formed of a number of theſe blended together; but in theſe maſſes ſome accidental foulneſs is often mixed with the gum. The ſingle drops uſually approach to a roundiſh, oblong, pear-like form. Galbanum is ſoft like wax, and, when freſh drawn, white; but it afterwards becomes yellowiſh or reddiſh: it is of a ſtrong ſmell, of an acrid and bitteriſh taſte; it is inflammable in the manner of a reſin, and ſoluble in water like a gum.

It attenuates and diſſolves tough phlegm, and is therefore of ſervice in aſthmas and inveterate coughs: it is alſo of great ſervice in hyſteric complaints; it diſſipates flatulencies, promotes the menſes, and facilitates delivery and the expulſion of the ſecundines. It is given in pills and electuaries, and is uſed externally in form of a plaſter, applied to the belly, againſt habitual hyſteric complaints, and on many other occaſions.

GALE, in the ſea language, a term of various import: when the wind blows not ſo hard but that a ſhip may carry her top-ſails a-trip (that is, hoiſted up to the higheſt) then they ſay it is a loom-gale. When it blows very ſtrong, they ſay it is a ſtiff, ſtrong, or freſh gale. When two ſhips are near one another at ſea, and there being but little wind blowing, one of them finds more of it than the other, they ſay that the one ſhip gales away from the other.

GALEARII, in roman antiquity, ſervants who attended the ſoldiers in the field, and carried their helmets; whence the name.

GALEASSE, a large low-built veſſel, uſing both ſails and oars, and the biggeſt of all the veſſels that make uſe of the latter. It may carry twenty guns, and has a ſtern capable of lodging a great number of marines. It has three maſts, which are never to be lowered or taken down. It has alſo thirty-two benches of rowers and to each bench ſix or ſeven ſlaves, who ſit under cover. This veſſel is at preſent only uſed by the Venetians.

GALEGA, GOAT-RUE, in botany, a genus of the diadelphia-decandria claſs of plants, the calyx of which is a ſhort tubulated, ſingle leafed perianthium, divided into five half ſegments; the corolla is papilionaceous; the fruit is a round, very long pod, containing ſeveral oblong kidney-ſhaped ſeeds.

Goat-rue has been accounted a good ſudorific, but is little uſed in the preſent practice.

GALENIA, in botany, a genus of the octandria-digynia claſs of plants, having no corolla; the calyx is a very ſmall, hollow perianthium, divided into four oblong ſegments; the antheræ are didymous; and the fruit a roundiſh, bilocular capſule, containing two oblong and angulated ſeeds.

GALENIC, or GALENICAL, in pharmacy, a manner of treating diſeaſes founded on the principles of Galen.

The diſtinction of galenical and chemical, was occaſioned by a diviſion of the practitioners of medicine into two ſects, which happened on the introduction of chemiſtry into medicine; then the chemiſts, arrogating to themſelves every kind of merit and ability, ſtirred up an oppoſition to their pretenſions, founded on the invariable adherence of the other party to the antient practice. And though this diviſion into the two ſects of galeniſts and chemiſts

chemists has long ceased, yet the distinction of medicines, which resulted from it, is still retained.

Galenical medicines are those which are formed by the easier preparations of herbs, roots, *&c.* by infusion, decoction, *&c.* and by combining and multiplying ingredients; while those of chemistry, draw their more intimate and remote virtues by means of fire and elaborate preparations, as calcination, digestion, fermentation, *&c.*

The late improvements in philosophy, which have retrieved the reputation of galenical pharmacy, have also greatly reformed it. It is now become all mechanical and corpuscular; and instead of qualities and degrees, every thing is now reduced to mechanical affections; to the figures, bulks, gravities, *&c.* of the component particles, and to the great principle of attraction.

GALENISTS, in church-history, a branch of anabaptists, who are said to have adopted several arian opinions concerning the divinity of our Saviour. See the articles ARIANS and ANABAPTISTS.

GALEOPSIS, HEMP-LEAVED DEAD-NETTLE, in botany, a genus of the didynamia-gymnospermia class of plants, the flower of which is monopetalous, with the upper lip crenated and arched, and the lower one trifid: the seeds are four in number, and contained in the cup. Both the leaves and seeds of this plant are used in medicine, and said to be discutient and antiseptic.

GALERITA, in ichthyology, a species of blennius. See the article BLENNIUS.

The galerita is distinguished from the other species of blennius, by a transverse cutaceous crest on the head.

GALEUS, in ichthyology, a name by which several species of sharks are called. See the article SHARK.

GALICIA, the most north-west province of Spain, bounded by the ocean on the north-west, by the province of Asturias and Leon on the east, and by Portugal on the south.

GALICIA, or GUADALAJARA, a province of Mexico, bounded by new Mexico on the north, by the gulph of Mexico on the east, by Mexico proper on the south, and by the Pacific ocean and gulph of California on the west.

GALILE, or GALILEE, once a province of Judea, now of Turky in Asia, was bounded by mount Lebanon on the north, by the river Jordan and the sea of Galilee on the east, by the river Chison on the south, and by the Mediterranean on the west. It was the scene of many of our Saviour's miracles.

GALILEANS, a sect of the Jews. Their founder was one Judas, a native of Galilee, from which place they derived their name. Their chief, esteeming it an indignity for the Jews to pay tribute to strangers, raised up his countrymen against the edict of the emperor Augustus, which had ordered a taxation or enrollment of all the subjects of the roman empire.

They pretended that God alone should be owned as master and lord; and in other respects were of the opinion of the pharisees: but, as they judged it unlawful to pray for infidel princes, they separated themselves from the rest of the Jews, and performed their sacrifices apart.

GALIUM, or GALLIUM, in botany. See the article GALLIUM.

GALL, in the animal œconomy, the same with bile. See BILE and BILIOUS.

GALL-BLADDER, called vesicula, and cystis fellea, is usually of the shape of a pear, and of the size of a small hen's egg. It is situated in the concave side of the liver, and lies upon the colon, part of which it tinges with its own colour. It is composed of four membranes, or coats: the common coat; a vesicular one; a muscular one, consisting of straight, oblique, and transverse fibres; and a nervous one, of a wrinkled or reticulated surface within, and furnished with an unctuous liquor.

The use of the gall-bladder is to collect the bile, first secreted in the liver, and mixing it with its own peculiar produce to perfect it farther, to retain it together a certain time, and then to expel it.

GALL, in natural history, denotes any protuberance or tumour produced by the puncture of insects on plants and trees of different kinds.

These galls are of various forms and sizes, and no less different with regard to their internal structure. Some have only one cavity, and others a number of small cells communicating with each other. Some of them are as hard as the wood of the tree they grow on, whilst others are soft and spongy; the first being termed gall nuts, and the latter berry-galls, or apple-galls.

The general history of galls is this: an insect of the fly-kind is instructed by nature to take care for the safety of her young,

young, by lodging her eggs in a woody ſubſtance, where they will be defended from all injuries : ſhe for this purpoſe wounds the branches of a tree ; and the lacerated veſſels, diſcharging their contents, ſoon form tumours about the holes thus made. The hole in each of theſe tumours, through which the fly has made its way, may for the moſt part be found ; and when it is not, the maggot-inhabitant or its remains are ſure to be found within, on breaking the gall. However, it is to be obſerved, that in thoſe galls which contain ſeveral cells, there may be inſects found in ſome of them, though there be a hole by which the inhabitant of another cell has eſcaped.

Oak-galls put, in a very ſmall quantity, into a ſolution of vitriol in water, though but a very weak one, give it a purple or violet colour; which, as it grows ſtronger, becomes black ; and on this property depends the art of making our writing-ink, as alſo a great deal of thoſe of dying and dreſſing leather, and other manufactures.

In medicine, galls are found to be very aſtringent, and good, under proper management, in diarrhœas, dyſenteries, and hæmorrhages of all kinds ; they have alſo a very eminent virtue as a febrifuge. Half a dram, or more, of the powder of Aleppo-galls may be given for a doſe, and will often cure an intermittent fever. They are alſo uſed externally by way of fomentation in procidentiæ of the anus: and a decoction of them has been injected in the fluor albus, with very great ſucceſs.

St. GALL, in geography, a town of Switzerland, five miles weſt of the lake of Conſtance ; forming a republic of itſelf, but without any territory. Its legiſlative power is lodged in two councils. It is ſaid to contain 10,000 inhabitants, all employed in the linen-manufacture.

GALLANT, or GALANT, a french term adopted into our language, and ſignifying polite, civil, and well bred, with a diſpoſition to pleaſe, particularly the ladies. It alſo ſignifies brave or courageous.

GALLEON, or GALLION, in naval affairs. See the article GALLION.

GALLERY, in architecture, a covered place in a houſe, much longer than broad, and uſually in the wings of a building ; its uſe being chiefly to walk in.

GALLERY, in fortification, a covered walk acroſs the ditch of a town, made of ſtrong beams, covered over head with planks, and loaded with earth : ſometimes it is covered with raw hides to defend it from the artificial fires of the beſieged. Its ſides ſhould be muſquet-proof. It ought to be eight foot high, and ten or twelve wide, and the covering to riſe with a ridge, that what is thrown upon it by the beſiegers with a deſign to burn it, may roll off. See plate CIX, fig. 2.

Galleries are chiefly uſed to ſecure and facilitate the miners approach to the face of the baſtion, over the moat, which is already ſuppoſed to be filled up with faggots and bavins, and the artillery of the oppoſite flank diſmounted.

GALLERY *of a mine*, is a narrow paſſage, or branch of a mine carried on under-ground to a work deſigned to be blown up.

Both the beſiegers and the beſieged alſo, carry on galleries in ſearch of each others mines, and theſe ſometimes meet and deſtroy each other.

GALLERY, in a ſhip, that beautiful frame, which is made in the form of a balcony, at the ſtern of a ſhip without board ; into which there is a paſſage out of the admiral's or captain's cabbin, and is for the ornament of the ſhip.

GALLERY, in gardening, a kind of covered walk, in a garden, formed into porticoes or arches, with horn-beams, lime-trees, or the like.

Each pillar of the porticoes or arches ought to be four feet diſtant from the other, and the gallery twelve feet high, and ten feet wide, that there may be room for two or three perſons to walk a-breaſt.

In forming theſe galleries, it is to be obſerved, that when the horn-beams are grown to the height of three feet, and the diſtance of the pillars well regulated ; the next thing to be done is, to form the frontiſpiece : to perform which, the horn-beam muſt be run up a trellace made for that purpoſe, which forms the arch, and as it grows up, thoſe bows which out-ſhoot the others, muſt be cut with the ſheers, and in time they will grow ſtrong, and may be kept in form by the ſheers.

Whiſpering GALLERY. See WHISPERING.

GALLEY, in naval affairs, a low-built veſſel, uſing both ſails and oars, and commonly carrying only a main-maſt and fore-maſt, which may be ſtruck or lowered at pleaſure. Such veſſels are much

much uſed in the Mediterranean, eſpecially by the king of France. See SHIP.

Condemnation to the GALLEYS, the puniſhment of being compelled to ſerve on board theſe veſſels, impoſed on certain criminals in France; and that either for life, or for a limited number of years, according to the nature of their crimes.

GALLEY, or GALLY, in printing. See the article GALLY.

GALLI, in antiquity, the prieſts of the goddeſs Cybele, who were eunuchs, and took their name from Gallus, a river in Phrygia.

When a youth was to be initiated into this order, the cuſtom was to throw off his cloaths, to run crying aloud into the midſt of the troop, and then drawing a ſword to caſtrate himſelf; after this, he ran about the ſtreets, carrying in his hands the marks of his mutilation, which he was to throw into a houſe, and in that houſe to put on a woman's dreſs.

GALLIAMBIC VERSE, *Galliambus*, in antient poetry, a verſe conſiſting of ſix feet, *viz.* an anapeſt, or a ſpondee; an iambus, or an anapeſt, or a tribrach; an iambus; a dactyl; a dactyl; an anapeſt.

The word Galliambus, is a compound of iambus and gallus, a prieſt of Cybele. Theſe prieſts carried about the image of that goddeſs, in order to get alms, and as a part of their employment was ſinging verſes all over the country, they, by this means, rendered poetry very deſpicable.

GALLIARD, a gay, ſprightly, whimſical kind of dance, formerly much uſed, conſiſting of very different motions and actions, ſometimes running ſmoothly along, then capering, ſometimes along the room, and ſometimes acroſs.

This dance was brought from Rome; from whence it was alſo called romaneſque.

GALLIARDA, the name of a tune that belongs to a dance called a galliard.

It is commonly in triple time, of a briſk and lively humour, and ſomething like a jig.

GALLICAN, any thing belonging to France: thus the term gallican church denotes the church of France, or the aſſembly of the clergy of that kingdom. See the article CHURCH.

GALLICAN BREVIARY, the breviary uſed by the church of Agregentum in Sicily: probably ſo called from its being introduced by St. Gerlan, who was made biſhop of Agregentum after the Saracens were driven out of Sicily by earl Roger; and by the other french biſhops, brought thither by norman princes.

GALLICISM, a mode of ſpeech peculiar to the french language, and contrary to the rules of grammar in other languages.

GALLINÆ, in ornithology, an order of birds, the beak of which is conic, and ſomewhat incurvated, and the upper chap imbricated.

Under this order are comprehended the oſtrich, peacock, pheaſant, wood-cock, turkey, the common dunghill cock, partridge, &c. See the articles OSTRICH, PEACOCK, &c.

GALLINACEOUS, an appellation given to the birds of the order of the gallinæ. See the article GALLINÆ.

GALLINAGINIS CAPUT, in anatomy. See CAPUT GALLINAGINIS.

GALLINAGO, in ornithology, a bird called in engliſh the ſnipe. See SNIPE.

GALLING, or EXCORIATION, in medicine. See EXCORIATION.

GALLING *of a horſe's back*, a diſorder occaſioned by heat, and the chafing or pinching of the ſaddle.

In order to prevent it, ſome take a hind's ſkin well garniſhed with hair, and fit it neatly under the pannel of the ſaddle, ſo that the hairy ſide may be next the horſe.

When a horſe's back is galled upon a journey, take out a little of the ſtuffing of the pannel over the ſwelling, and ſew a piece of ſoft white leather on the inſide of the pannel; anoint the part with ſalt butter, and every evening wipe it clean, rubbing it till it grow ſoft, anointing it again with butter, or for want of that, with greaſe: waſh the ſwelling, or hurt, every evening with cold water and ſoap, and ſtrew it with ſalt, which ſhould be left on till the horſe be ſaddled in the morning.

GALLION, or GALLEON, in naval affairs, a ſort of ſhips employed in the commerce of the Weſt-Indies. The Spaniards ſend annually two fleets; the one for Mexico, which they call the flota, and the other for Peru, which they call the gallions. See the article FLOTA.

By a general regulation made in Spain, it has been eſtabliſhed, that there ſhould be twelve men of war, and five tenders, annually fitted out for the armada or galleons; eight ſhips of ſix hundred tons burden each, and three tenders, one of an hundred tons, for the iſland Margarita, and two of eighty each, to follow the armada: for the New Spain fleet, two

two ſhips of ſix hundred tons each, and two tenders of eighty each; and for the Honduras fleet, two ſhips of five hundred tons each: and, in caſe no fleet happened to ſail any year, three gallions and a tender ſhould be ſent to New Spain for the plate.

They are appointed to ſail from Cadiz, in January, that they may arrive at Porto-Bello about the middle of April, where the fair being over, they may take aboard the plate, and be at Havanna with it about the middle of June, where they are joined by the flota, that they may return to Spain with the greater ſafety.

GALLIOT, a ſmall gally deſigned only for chace, carrying only one maſt, and two or three pattereroes; it can both ſail and row, and has ſixteen or twenty oars. All the ſeamen on board are ſoldiers, and each has a muſket by him on quitting his oar.

GALLIPAGO-ISLANDS, are ſituated in the Pacific Ocean on both ſides the equator, between 85° and 90°, weſt longitude, and about four hundred miles weſt of Peru.

GALLIPOLI, a port-town of european Turky, ſituated at the entrance of the Propontis, or Sea of Marmora, about 100 miles ſouth weſt of Conſtantinople: eaſt long. 28°, and north lat. 40° 45.

GALLIPOLI is alſo a port-town of the kingdom of Naples, ſituated on the gulph of Otranto, about twenty-three miles weſt of that city: eaſt long. 19°, and north lat. 40° 25′.

GALLIUM, LADIES-BEDSTRAW, in botany, a genus of the tetrandria monogynia claſs of plants, the flower of which is a quadrifid ſingle petal, without any tube, and placed flatwiſe: the fruit conſiſts of two globoſe bodies, growing cloſe together, but not adhering, and containing each a ſingle kidney-ſhaped ſeed. It is ſaid to be an excellent aſtringent.

GALLO, an iſland on the Pacific Ocean near the coaſt of Peru, about 200 miles weſt of Popayan: weſt longitude 80°, and north latitude 2° 15′.

GALLO is alſo a town of Italy, ten miles ſouth of Ancona.

GALLO, or PUNTO GALLO, a ſea-port of Ceylon, ſubject to the Dutch: eaſt long. 78°, and north lat. 6°.

GALLON, a meaſure of capacity both for dry and liquid things, containing four quarts; but theſe quarts, and conſequently the gallon itſelf, are different, according to the quality of the thing meaſured: for inſtance, the wine-gallon contains 231 cubic inches, and holds eight pounds averdupois of pure water: the beer and ale gallons contain 282 ſolid inches, and holds ten pounds three ounces and a quarter averdupois, of water: and the gallon for corn, meal, &c. 272½ cubic inches, and holds nine pounds thirteen ounces of pure water.

GALLOON, in commerce, a narrow thick kind of ferret, or lace, uſed to edge or border cloaths, ſometimes made of wool, and at other times of gold or ſilver.

GALLOP, in the manege, a motion of a horſe that runs at full ſpeed, in which making a kind of leap forwards, he lifts both his fore-legs almoſt at the ſame time; when theſe are in the air, juſt upon the point of touching the ground, he lifts both his hind-legs almoſt at once.

A horſe in galloping forwards, may lead with which fore-leg he pleaſes, tho' horſes do it moſt commonly with their right fore-leg; but with whatever fore-leg they lead, the hind-leg of the ſame ſide muſt follow it, otherwiſe their legs are ſaid to be diſunited. To remedy this diſorder, the rider muſt ſtay the horſe a little upon the hand, and give him the ſpur on the contrary ſide to that in which he is diſunited.

In a circle, a horſe is always to lead with the fore leg, within the turn; otherwiſe he is ſaid to gallop falſe; but here too, the hind-leg of the ſame ſide muſt follow.

GALLOPADE, in the manege, alſo termed the fine gallopade, the ſhort gallop, the liſtening gallop, and the gallop of the ſchool, is a hand-gallop, in which a horſe galloping upon one or two treads, is well united, well knit together, and well coupled. Hence it is ſaid, that a horſe makes a gallopade, and works with one haunch; that is, inſtead of going upon one tread, whether right-out, or in a circle, he has one haunch kept in ſubjection, let the turn or change of the hand be what it will; ſo that the inner haunch, which looks to the center of the ground is more narrowed, and comes nearer to the center than the ſhoulder; and thus the horſe does not go altogether to that ſide, and his way of working is a little more than one tread, and ſomewhat leſs than two.

GALLOWAY, a province of Scotland, which gives the title of earl to a branch of the noble family of Stuart.

It is divided into two diftricts; the weftern, called Upper Galloway, being the fame with Wigtonfhire; and the eaftern, or ftewarty of Kirkcudbright, called Lower Galloway.

Galloway is alfo the capital of a county of the fame name, in the province of Connaught, in Ireland: weft long. 9° 12′, and north lat. 53° 12′.

It has a good port and is advantageoufly fituated for a foreign trade.

New-Galloway, a borough town of Scotland, in the county of Wigton, with which, and fome other boroughs, it claffes.

GALLOWS, an inftrument of punifhment, on which perfons convicted of felony, *&c.* are executed by hanging. It is formed of two pieces of timber fixed in the earth, with a beam faftened to each on the top; or with three pieces of timber fixed in the earth, with three pieces on the top, forming a triangle.

Gallows *of a plough*, a part of the plough-head, fo called by farmers, from its refemblance to the common gallows, as confifting of three pieces of timber, whereof one is placed tranfverfely over the heads of the other two. See the article Plough.

GALLS, in natural hiftory. See Gall.

Harnefs-Galls, among farriers. See the article Harness.

GALLUS, the Cock, in ornithology, a well-known domeftic fowl, the head of which in ornamented with a longitudinal flefhy cruft, or comb: the wattles are two, and placed longitudinally on the throat. This, in its natural ftate, is a very robuft and beautiful bird, variegated with a great number of elegant colours. See plate CX. fig. 1. where n° 1. reprefents the common dunghill-cock, and n° 2. the hen.

GALLY, in printing, a frame into which the compofitor empties the lines out of his compofing-ftick, and in which he ties up the page when it is completed.

The gally is formed of an oblong fquare board, with a ledge on three fides, and a grove to admit a falfe-bottom, called a gally-flice.

Gally, in the fea-language, is a place in the cook-room, where the grates are fet up, and in which fires are made for roafting or boiling the victuals.

Gally-worm, in zoology, the englifh name of the julus of authors. See the article Julus.

GAMBEZON, or Gamba, in antiquity, a kind of foft quilted waiftcoat, worn under the coat of mail to prevent its hurting the body. It was made of wool or cotton, quilted between two ftuffs, and was alfo called counterpoint.

GAMBIA a great river of Africa, which, running from eaft to weft falls into the Atlantic ocean in 14° north lat. and 15° weft long.

It is faid to be navigable for floops 600 miles. About ten leagues up this river is James's Ifland, a fettlement belonging to Great Britain: it is very fmall, being lefs than a mile in circumference, but is defended by a fort.

GAMBOGE is a concreted vegetable juice, the produce of two trees, both called by the Indians caracapulli, and is partly of a gummy, and partly of a refinous nature. It is brought to us either in form of orbicular maffes, or of cylindrical rolls of various fizes; and is of a denfe, compact, and firm texture, and of a beautiful yellow. It is chiefly brought to us from Cambaja, in the Eaft-Indies, called alfo Cambodja, and Cambogia; and from thence it has obtained its names of cambadium, cambogium, and gambogium.

It is a very rough and ftrong purge; it operates both by vomit and ftool, and both ways with much violence, almoft in the inftant in which it is fwallowed; but yet without griping. It requires caution and judgment in adminiftring it; but thofe who know how to give it properly, find it an excellent remedy in dropfies, cachexies, jaundice, afthmas, catarrhs, and in the worft cutaneous eruptions.

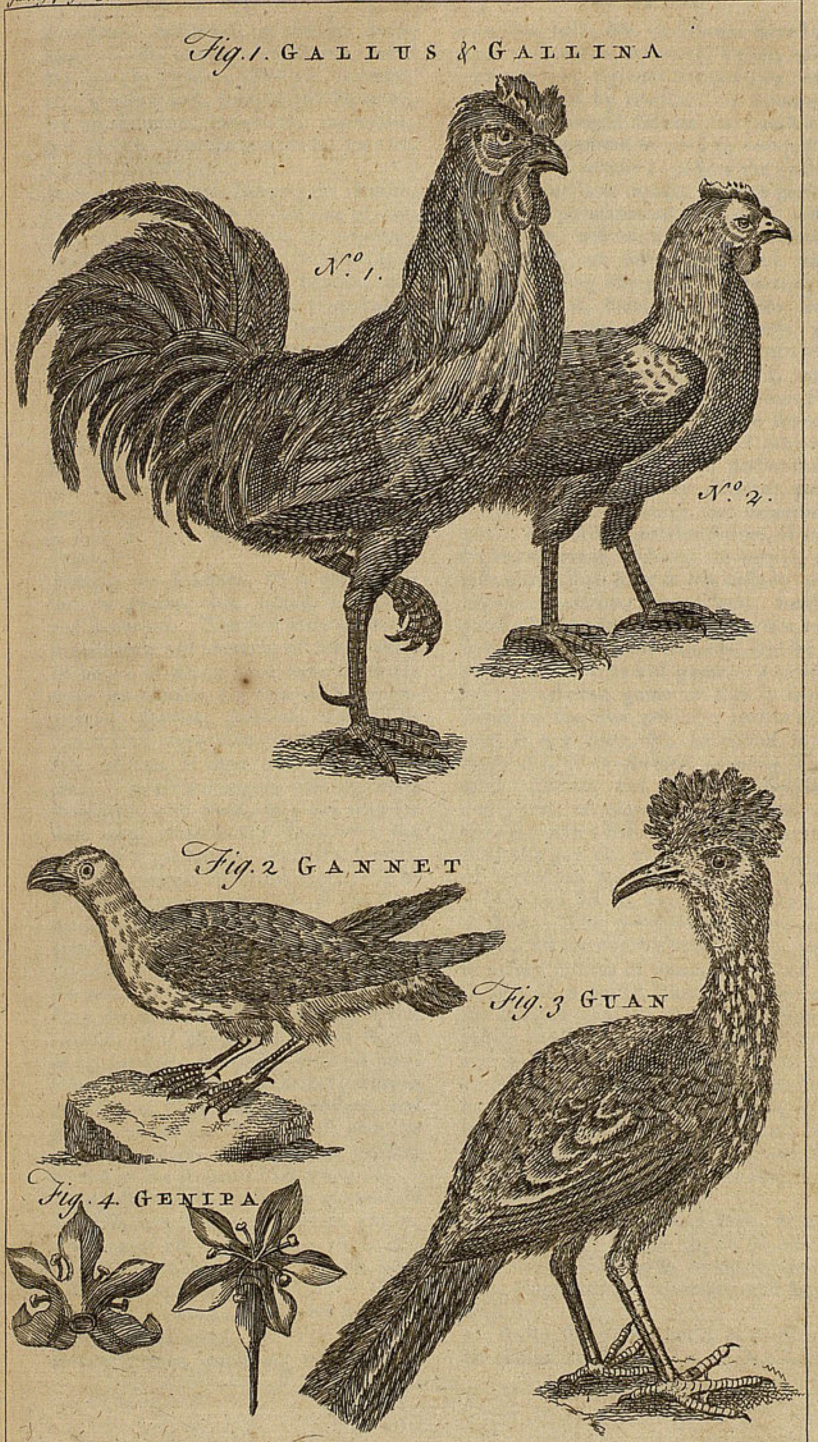
Its dofe is from two or three grains to fix, eight or ten: four grains generally operate brifkly without vomiting, and eight or ten grains ufually vomit brifkly, and afterwards purge downwards.

It is at prefent much more efteemed by painters in water colours, than by phyficians.

GAME, *ludus*, in general, fignifies any diverfion, or fport, that is performed with regularity, and reftrained to certain rules. See the article Gaming.

Games are ufually diftinguifhed into thofe of exercife and addrefs, and thofe of hazard. To the firft belong chefs, tennis, billiards, wreftling, *&c.* and to the latter thofe performed with cards or dice, as back-gammon, ombre, picquet, whift, *&c.* See the articles Chess, Back-gammon, *&c.*

Games, *ludi*, in antiquity, were public diverfions


Fig. 1. GALLUS & GALLINA
N.o 1.
N.o 2.
Fig. 2 GANNET
Fig. 3 GUAN
Fig. 4. GENIPA
T. Jefferys sculp

diversions, exhibited on solemn occasions. Such, among the Greeks, were the olympic, pythian, isthmian, nemæan, *&c.* games; and, among the Romans, the apollinarian, circensian, capitoline, *&c.* games. See the articles OLYMPIC, PYTHIAN, *&c.*

It was also customary, among the Greeks, for persons of quality to institute games, with all sorts of exercises, as running, wrestling, boxing, *&c.* at the funerals of their friends, to do them honour, and render their death more remarkable. This practice is frequently mentioned by antient writers, as Miltiades's funeral in Herodotus, Brasidas's in Thucydides, Timoleon's in Plutarch, with many more. Nor was this custom peculiar to later ages, since we find the description of Patroclus's funeral games takes up the greatest part of one of Homer's iliads; and even prior to this, Oedipus's funeral is said to have been solemnized with sports.

Among the Romans, there were three sorts of games, *viz.* sacred, honorary, and ludicrous. The first were instituted immediately in honour of some deity or hero; of which kind were those already mentioned, together with the augustales, florales, palatini, *&c.* The second class were those exhibited by private persons, at their own expence, in order to please the people, and ingratiate themselves with them, to make way for their own preferment: such were the combats of gladiators, the scenic games, and other amphitheatrical sports. The ludicrous games were much of the same nature with the games of exercise and hazard among us: such were the ludus trojanus, tesseræ, tali, trochus, *&c.* See the article TROJAN GAME, *&c.*

By a decree of the roman senate, it was enacted, that the public games should be consecrated, and united with the worship of the gods as a part thereof; whence it appears, that feasts, sacrifices, and games, made up the greatest part, or rather the whole, of the external worship offered by the Romans to their deities.

Others distinguish the roman games into 1. The equestrian, or curule games, which were the same with the circensian. 2. The gymnic games, wherein were exhibited gladiatorial, and other shews of the like nature: these were sacred to Mars and Minerva. 3. The theatrical entertainments, consisting of tragedies, comedies, balls, *&c.* these were sacred to Apollo, Bacchus, Minerva, Venus, *&c.*

GAME, in law, signifies birds or prey, taken or killed by fowling, or hunting. There are several statutes for punishing offences committed by persons not qualified by law, to take or destroy the game. The antient laws ordain, that no person shall take pheasants or partridges, with engines in another's ground, without his licence, on forfeiture of 10l. and persons killing any pheasant, partridge, pigeon, duck, hare, or other game, forfeit 20s. for every fowl, hare, *&c.* 11 Hen. VII. 1 Jac. I. c. 17. Constables having a justice of peace's warrant, may search the houses of suspected persons for game; and in case any be there found, and they do not give a good account how they came by it, such person shall forfeit for each hare or pheasant, partridge, *&c.* not under 5s. nor exceeding 20s. Likewise by another statute, if any higler, chapman, carrier, inn-keeper, or victualler, shall have in his custody any hares, pheasants, partridges, heath-game, *&c.* he forfeits for every hare and fowl, 5l. unless the same be sent by a person qualified to kill game. The selling or offering game to sale is made liable to the like penalty; and in that case, if any hare, *&c.* be found in a shop, *&c.* it is deemed exposing it to sale. Persons not qualified, keeping dogs, nets, or engines to kill game, on their conviction before a justice of peace, shall also pay 5l. or be sent to the house of correction for three months, 4 and 5 W. and M. c. 23. 5 Ann. c. 14. 9 Ann. The penalties for destroying game, are recoverable by action, as well as before justices of peace, by 8 Geo. I. c. 19. If a person hunts any game on the land of another, such other cannot justify the killing of his dogs. Where one in hunting starts a hare upon his own land, and then follows and kills such hare in another person's ground, it is lawful, and the game is his own; but where a man starts a hare on another's land, and kills it there, he is subject to an action of trespass.

GAME-COCK, a fighting cock, or one kept for sport; in the choice of which, four things are chiefly to be regarded, *viz.* shape, colour, courage, and sharp heel.

1. As to shape, a game-cock must not be chosen either too large, or too small: the

the first being generally unwieldy, and unactive; the other weak and tedious in fighting. The middle-sized cock is therefore most proper for this purpose, as being strong, nimble, and easily matched; his head ought to be small, with a quick large eye and a strong beak, which should be crooked, and in colour suitable to the plume of his feathers; the beam of his leg should be strong, and of the colour of his plume; his spurs should be rough, long and sharp; a little bending, and pointing inward. 2. The best colour for a game-cock is either that of a grey, yellow, or red: the pyed pile may pass indifferently; but the white and dun are rarely known to be good for any thing. If his neck be invested with a scarlet complexion, it is a sign of his being strong, lusty and courageous: whereas a pale and wan complexion denotes him faint and unhealthy. 3. His courage may be known by his proud, upright standing, and stately tread in walking; and if he crows frequently in the pen, it is a proof of spirit. 4. His sharpness of heel is known only from observation in fighting; that is, when at every rising he hits so that he draws blood from his adversary; gilding his spurs continually, and at every blow threatening him with immediate death.

To prepare a cock to fight; 1. With a pair of fine shears, cut all his mane off, close to his neck, from the head to the setting of the shoulders. 2. Clip off all the feathers from the tail close to his rump, and the redder it appears, the better is the cock in condition. 3. Spread his wings by the length of the first rising feather; and cut off the rest slope-wise, with sharp points, that in his rising he may therewith endanger an eye of his adversary. 4. Scrape, smooth and sharpen his spurs with a pen knife: and, lastly, see that there be no feathers on the crown of his head, for his opponent to take hold of; and moisten his head all over with your spittle.

GAME-HEN, should be of a black, brown, speckled grey, grizzle, or yellow colour: being tufted on the crown denotes courage and resolution; and having the addition of weapons, conduces very much to her excellency. Her body should be big and well poked behind, for the production of large eggs. A general remark is, that a right hen of the game, from a dung-hill cock, will bring forth very good chickens; but the best game cock from a dunghil hen, will never get a bird fit for the game.

GAME-KEEPERS, are those who have the care of keeping and preserving the game, and are appointed to that office by lords of manors, &c. who not being under the degree of esquire, may, by a writing under their hands and seals, authorize one or more game-keepers, who may seize guns, dogs or nets used by unqualified persons for destroying the game. Game-keepers are also to be persons either qualified by law to kill the game, or to be truly and properly the servants of the lords or ladies of manors appointing them; and no game-keeper can qualify any person to such end, or to keep dogs, &c. 5 Ann. c. 14. 9 Ann. c. 25. 3 Geo. I. c. 11.

The persons qualified to keep guns, dogs, &c. are those who have a free warren, 100l. a year by inheritance, or for life, or a lease for ninety-nine years of 150l. per annum, also the eldest sons of esquires, &c. 22 and 23 Car. II. c. 25.

A lord of a manor may appoint a game-keeper within his manor and royalty to kill hares, pheasants, partridges, &c. for his own use, the name of whom is to be entered with the clerk of the peace of the county; and if any other game-keeper, or one legally authorized, under colour of his authority, kills game, and afterwards sells it, without the consent of the person that impowers him, he is on conviction to suffer corporal punishment.

GAMELIA, γαμηλια, in grecian antiquity, a nuptial feast, or rather sacrifice, held in the antient greek families on the day before a marriage; thus called, from a custom they had of shaving themselves on this occasion, and presenting their hair to some deity to whom they had particular obligations.

GAMELION, a poem, or composition in verse on the subject of a marriage, commonly called an epithalamium. See the article EPITHALAMIUM.

GAMELION, in antient chronology, was the eighth month of the Athenian year, containing twenty-nine days, and answering to the latter part of our January, and beginning of February. It was thus called, as being, in the opinion of the Athenians, the most proper season of the year for marriage.

GAMING, the art of playing or practising

tiſing any game, particularly thoſe of hazard, as cards, dice, tables, &c.

Gaming has, at all times, been looked on as a thing of pernicious conſequence to the common-wealth; and is, therefore, ſeverely prohibited by law. The ſtatute 33 Hen. VIII. gives juſtices of peace, and head officers in corporations, a power to enter all houſes ſuſpected of unlawful games; and to arreſt the gameſters, till they give ſecurity not to play for the future. Perſons keeping any unlawful gaming-houſe, are fined 40 s. and the gameſters 6 s. 8 d. a time. If any perſons by fraud, deceit, or unlawful device, in playing either at cards or dice, tables, bowls, cock fighting, horſe-races, foot-races, &c. or bearing a ſhare in the ſtakes, or betting, ſhall win any money or valuable thing of another, he ſhall forfeit treble the value thereof: likewiſe if any perſon ſhall play at any of the ſaid games upon tick, and not for ready money, and loſe the ſum of 100 l. on credit, at any one meeting, if the money be not paid down, his ſecurity taken for it ſhall be void, and the winner becomes liable to a forfeiture of treble value of ſuch money won. 16 Car. II. c. 7. Not only all notes, bills, bonds, mortgages, or other ſecurities given for money won at gaming, are declared void; but alſo where lands are granted, they ſhall go to the next perſon intitled, after the deceaſe of the perſon ſo incumbering the ſame: perſons loſing by gaming at one time 10 l. may recover the money loſt, from the winner, by an action of debt brought within three months; and on the loſer's not proſecuting, any other perſon may lawfully do it, and recover treble the value with coſts. 9 Ann. c. 14. Thoſe who cheat at cards, dice, &c. beſides their forfeitures, have inflicted on them ſuch infamy and corporal puniſhment, as in caſes of perjury; and perſons beating or challenging any other perſon to fight, on account of money won by gaming, ſhall forfeit all their goods, and be impriſoned two years: and where perſons play that have no viſible eſtates, and do not make it appear that the principal part of their maintenance is got by other means than gaming, they may be bound to their good behaviour by two juſtices of the peace, &c. Stat. *ibid.* See 2 Geo. II. c. 28. The ace of hearts, pharaoh, baſſet, and hazard, are judged to be lotteries by cards or dice; and perſons who ſet up thoſe games, are ſubject to 200 l. penalty. And every adventurer, who ſhall play, ſtake, or punt at them, forfeits 50 l. Alſo any ſales of houſes, goods, plate, &c. in ſuch a way, are void, and the things forfeited to any who will ſue for the ſame. 12 Geo. II. c. 28.

Laws of GAMING. Theſe are founded on the doctrine of chances. See the article CHANCE.

Mr. de Moivre, in a treatiſe de Menſura Sortis, has computed the variety of chances in ſeveral caſes that occur in gaming, the laws of which may be underſtood by what follows.

Suppoſe p the number of caſes in which an event may happen, and q the number of caſes wherein it may not happen, both ſides have the degree of probability, which is to each other as p to q.

If two gameſters, A and B, engage on this footing, that, if the caſes p happen, A ſhall win; but, if q happen, B ſhall win, and the ſtake be a; the chance of A will be $\frac{pa}{p+q}$, and that of B $\frac{qa}{p+q}$; conſequently, if they ſell the expectancies, they ſhould have that for them reſpectively.

If A and B play with a ſingle die, on this condition, that, if A throw two or more aces at eight throws, he ſhall win; otherwiſe B ſhall win; what is the ratio of their chances? Since there is but one caſe wherein an ace may turn up, and five wherein it may not, let $a=1$, and $b=5$. And again, ſince there are eight throws of the die, let $n=8$; and you will have $\overline{a+b}|^{n}-b^{n}-nab^{n-1}$, to $b^{n}+nab^{n-1}$: that is, the chance of A will be to that of B, as 663991 to 1015625, or nearly as 2 to 3.

A and B are engaged at ſingle quoits, and, after playing ſome time, A wants 4 of being up, and B 6; but B is ſo much the better gameſter, that his chance againſt A upon a ſingle throw would be as 3 to 2; what is the ratio of their chances? Since A wants 4, and B 6, the game will be ended at nine throws; therefore, raiſe $a+b$ to the ninth power, and it will be $a^9+9a^8b+36a^7bb+84a^6b^3+126a^5b^4+126a^4b^5$, to $84a^3b^6+36aab^7+6ab^3+b^9$: call a 3, and b 2, and you will have the ratio of chances in numbers, *viz.* 1759077 to 194048.

A and B play at ſingle quoits, and A is the beſt gameſter, ſo that he can give B 2 in 3, what is the ratio of their chances

ces at a single throw? Suppose the chances as z to 1, and raise $z+1$ to its cube, which will be z^3+3z^2+3z+1. Now since A could give B 2 out of 3, A might undertake to win three throws running; and, consequently, the chances in this case will be as z^3 to $3z^2+3z+1$. Hence $z^3=3z^2+3z+1$; or, $2z^3=z^3+3z^2+3z+1$. And, therefore, $z\sqrt[3]{2}=z+1$; and, consequently, $z=\frac{1}{\sqrt[3]{2}-1}$. The chances, therefore, are $\frac{1}{\sqrt[3]{2}-1}$, and 1, respectively.

Again, suppose I have two wagers depending, in the first of which I have 3 to 2 the best of the lay, and in the second 7 to 4, what is the probability I win both wagers?

1. The probability of winning the first is $\frac{3}{5}$, that is the number of chances I have to win, divided by the number of all the chances: the probability of winning the second is $\frac{7}{11}$: therefore, multiplying these two fractions together, the product will be $\frac{21}{55}$, which is the probability of winning both wagers. Now, this fraction being subtracted from 1, the remainder is $\frac{34}{55}$, which is the probability I do not win both wagers: therefore the odds against me are 34 to 21.

2. If I would know what the probability is of winning the first, and losing the second, I argue thus: the probability of winning the first is $\frac{3}{5}$, the probability of losing the second is $\frac{4}{11}$: therefore multiplying $\frac{3}{5}$ by $\frac{4}{11}$, the product $\frac{12}{55}$ will be the probability of my winning the first, and losing the second; which being subtracted from 1, there will remain $\frac{43}{55}$, which is the probability I do not win the first, and at the same time lose the second.

3. If I would know what the probability is of winning the second, and at the same time losing the first, I say thus: the probability of winning the second is $\frac{7}{11}$; the probability of losing the first is $\frac{2}{5}$: therefore, multiplying these two fractions together, the product $\frac{14}{55}$ is the probability I win the second, and also lose the first.

4. If I would know what the probability is of losing both wagers, I say, the probability of losing the first is $\frac{2}{5}$, and the probability of losing the second $\frac{4}{11}$: therefore, the probability of losing them both is $\frac{8}{55}$; which being subtracted from 1, there remains $\frac{47}{55}$: therefore, the odds of losing both wagers is 47 to 8.

This way of reasoning is applicable to the happening or failing of any events that may fall under consideration. Thus if I would know what the probability is of missing an ace four times together with a die, this I consider as the failing of four different events. Now the probability of missing the first is $\frac{5}{6}$, the second is also $\frac{5}{6}$, the third $\frac{5}{6}$, and the fourth $\frac{5}{6}$; therefore the probability of missing it four times together is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{625}{1296}$; which being subtracted from 1, there will remain $\frac{671}{1296}$ for the probability of throwing it once or oftener in four times: therefore the odds of throwing an ace in four times, is 671 to 625.

But if the flinging of an ace was undertaken in three times, the probability of missing it three times would be $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{216}$; which being subtracted from 1, there will remain $\frac{91}{216}$ for the probability of throwing it once or oftener in three times: therefore the odds against throwing it in three times are 125 to 91.

Again, suppose we would know the probability of throwing an ace once in four times, and no more: since the probability of throwing it the first time is $\frac{1}{6}$, and of missing it the other three times is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}$, it follows that the probability of throwing it the first time, and missing it the other three successive times, is $\frac{1}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{1296}$; but because it is possible to hit it every throw as well as the first, it follows, that the probability of throwing it once in four throws, and missing the other three, is $\frac{4\times125}{1296}=\frac{500}{1296}$; which being subtracted from 1, there will remain $\frac{796}{1296}$ for the probability of throwing it once, and no more, in four times. Therefore, if one undertake to throw an ace once, and no more, in four times, he has 500 to 796 the worst of the lay, or 5 to 8 very near.

Suppose two events are such, that one of them has twice as many chances to come up as the other, what is the probability that the event, which has the greater number of chances to come up, does not happen twice before the other happens once, which is the case of flinging 7 with two dice before 4 once? Since the number of chances are as 2 to 1, the probability of the first happening before the

the ſecond is $\frac{2}{3}$, but the probability of its happening twice before it, is but $\frac{2}{3}\times\frac{2}{3}$ or $\frac{4}{9}$: therefore it is 5 to 4 ſeven does not come up twice before four once.

But, if it were demanded, what muſt be the proportion of the facilities of the coming up of two events, to make that which has the moſt chances come up twice, before the other comes up once? The anſwer is 12 to 5 very nearly; whence it follows, that the probability of throwing the firſt before the ſecond is $\frac{12}{17}$, and the probability of throwing it twice is $\frac{12}{17}\times\frac{12}{17}$, or $\frac{144}{289}$; therefore, the probability of not doing it is $\frac{145}{289}$: therefore the odds againſt it are as 145 to 144, which comes very near an equality.

Suppoſe there is a heap of thirteen cards of one colour, and another heap of thirteen cards of another colour, what is the probability that, taking one card at a venture out of each heap, I ſhall take out the two aces?

The probability of taking the ace out of the firſt heap is $\frac{1}{13}$, the probability of taking the ace out of the ſecond heap is $\frac{1}{13}$; therefore the probability of taking out both aces is $\frac{1}{13}\times\frac{1}{13}=\frac{1}{169}$, which being ſubtracted from 1, there will remain $\frac{168}{169}$: therefore the odds againſt me are 168 to 1.

In caſes where the events depend on one another the manner of arguing is ſomewhat altered. Thus, ſuppoſe that out of one ſingle heap of thirteen cards of one colour I ſhould undertake to take out firſt the ace; and, ſecondly, the two: though the probability of taking out the ace be $\frac{1}{13}$, and the probability of taking out the two be likewiſe $\frac{1}{13}$; yet the ace being ſuppoſed as taken out already, there will remain only twelve cards in the heap, which will make the probability of taking out the two to be $\frac{1}{12}$; therefore the probability of taking out the ace, and then the two, will be $\frac{1}{13}\times\frac{1}{12}$.

In this laſt queſtion the two events have a dependence on each other, which conſiſts in this, that one of the events being ſuppoſed as having happened, the probability of the other's happening is thereby altered. But the caſe is not ſo in the two heaps of cards.

If the events in queſtion be n in number, and be ſuch as have the ſame number a of chances by which they may happen, and likewiſe the ſame number b of chances by which they may fail, raiſe $a+b$ to the power n. And if A and B play together, on condition that if either one or more of the events in queſtion happen, A ſhall win, and B loſe. the probability of A's winning will be $\frac{\overline{a+b}^n - b^n}{\overline{a+b}^n}$; and that of B's winning will be $\frac{b^n}{\overline{a+b}^n}$; for when $a+b$ is actually raiſed to the power n, the only term in which a does not occur is the laſt b^n: therefore, all the terms but the laſt are favourable to A.

Thus if $n=3$, raiſing $a+b$ to the cube $a^3+3a^2b+3ab^2+b^3$, all the terms but b^3 will be favourable to A; and therefore the probability of A's winning will be $\frac{a^3+3a^2b+3ab^2}{\overline{a+b}^3}$, or $\frac{\overline{a+b}^3-b^3}{\overline{a+b}^3}$; and the probability of B's winning will be $\frac{b^3}{\overline{a+b}^3}$. But if A and B play on condition, that if either two or more of the events in queſtion happen, A ſhall win; but in caſe one only happen, or none, B ſhall win; the probability of A's winning will be $\frac{\overline{a+b}^n - nab^{n-1} - b^n}{\overline{n+b}^n}$; for the only two terms in which aa does not occur, are the two laſt, *viz.* nab^{n-1} and b^n.

GAMMONING, among ſeamen, denotes ſeveral turns of rope taken round the bowſprit, and reeved through holes in knees of the head, for the greater ſecurity of the bowſprit.

GAMMUT, GAM, GAMMA, or GAMMA-UT, in muſic, a ſcale whereon we learn to ſound the muſical notes, *ut*, *re*, *mi*, *fa*, *ſol*, *la*, in their ſeveral orders and diſpoſitions. See NOTE and SCALE.

The invention of this ſcale is owing to Guido Aretine; tho' it is not ſo properly an invention as an improvement on the diagram, or ſcale of the Grecians. See the article DIAGRAM.

The gammut is alſo called the harmonical hand, by reaſon that Guido made firſt uſe of the figure of the hand to demonſtrate the progreſſion of his ſounds.

Guido, finding the diagram of the antients of too ſmall an extent, added five more chords or notes to it; one below the proſlambanomenos of the antients, and four above the nete hyperbolæon. The firſt he call d hypo-proſlambanomenos, and denoted it by the letter G, or the greek

greek Γ, gamma; which note being at the head of the ſcale, occaſioned the whole ſcale to be called by the name of gam, or gammut. This ſcale is divided into three ſeries or columns, the firſt called durum; the ſecond natural, and the third molle, as repreſented by the following ſcheme.

The Gamut or Scale of Guido.

		B.dur	Natl	Molle
	ee dd	la sol	mi re	la
	cc bb	fa mi	ut	sol
gs	aa g	re ut	la sol	fa mi re
	f e	la	fa mi	ut
	d c	sol fa	re ut	la sol
	b a	mi re	la	fa mi
	G f	ut	sol fa	re ut
	e d	la sol	mi re	
∋:	c B	fa mi	ut	
	a Γ	re ut		

The uſe of this ſcale is to make the paſſages and tranſitions from B molle to B durum, by means of tones and ſemitones. The ſeries of B natural ſtanding between the other two, communicates with both, ſo that to name the chord of the ſcale by theſe ſyllables, if we would have the ſemitones in their natural places, *viz.* *b*, *c*, and *e*, *f*, then we apply *ut* to *g*; and after *la* we go into the ſeries of B natural, at *fa*; and after the *la* of this, we return to the former at *mi*; and ſo on. And we may begin at *ut* in *c*, and paſs into the firſt ſeries at *mi*, and then back to the other at *fa*, by which means the one tranſition is a ſemitone, *viz.* *la*, *fa*, and the other a tone, *la*, *mi*. To follow the order of B molle, we may begin with *ut* in *c* or *f*, and make each ſemitone after the ſame manner.

Hence came the barbarous names of gammut, are, Bmi, &c. but what perplexed work is here with ſo many different ſyllables applied to each chord, and all to mark the places of the ſemitones, which the ſimple letters *a*, *b*, *c*, &c. do as well, and with more eaſe.

Several alterations have been made in the gammut. M. le Murs particularly added a ſeventh ſyllable, *viz.* *ſi*; and the Engliſh uſually throw out that and *ut*, and make the other ſerve for all, as will be ſhewn under the article Solfaing.

Gammut, or Gamm, is alſo the firſt or graveſt

graveſt note in the modern ſcale of muſic, the reaſon whereof is ſhewn under the preceding article.

GANDER, in ornithology, the male of the gooſe-kind; one of which, it is ſaid, will ſerve five geeſe. See GOOSE.

GANG, in the ſea language, the ſame with crew. See the article CREW.

The company wherewith a ſhip's boat is manned, is called the cockſwain's crew, or gang. See the article COCK-SWAIN.

GANG-WAY is the ſeveral paſſages or ways from one part of the ſhip to the other; and whatever is laid in any of thoſe paſſages, is ſaid to lie in the gang-way.

GANG-FISH, a ſpecies of coregonus, with the upper jaw longeſt and flat, and with fourteen rays in the back fin. See the article COREGONUS.

GANGEA, the capital of a territory in the province of Chirvan, in Perſia: eaſt long. 46°, north lat. 41°.

GANGES, a large river of the hither India, riſes in the mountains which ſeparate India from Tartary; and, running from the north-weſt to the ſouth-eaſt near 1500 miles through the Mogul's dominions, diſcharges itſelf by ſeveral channels into the bay of Bengal.

This river is worſhiped like a god by the ſuperſtitious Indians, many thouſands of whom annually undertake pilgrimages to it, and carry their dying friends to expire on its banks, and as ſoon as they die, heave them into the middle of it.

GANGI, or COULER, a town of Golconda, in the hither India: eaſt long. 79°, and north lat. 16°.

GANGLIO, or GANGLION, in ſurgery, a hard tubercle, generally moveable, in the external or internal part of the carpus, upon the tendons or ligaments in that part, uſually without any pain to the patient. Though ganglions ſo nearly reſemble an encyſted tumour, that Celſus makes them one and the ſame; yet their difference may appear, if it were only from their different ſeats; ganglions being confined to the tendons and ligaments of the hands and feet, whereas encyſted tumours are not reſtrained to any part of the body. See the article ENCYSTED.

With regard to the cauſe of ganglions, they ſeem generally to proceed from an inſpiſſation of the viſcid juices, which are let out, and lodged betwixt the fibres and membranes, when the tendons and ligaments of thoſe parts have been injured by a fall, blow, ſtrain, contuſion, or the like, in which caſe they gradually increaſe more or leſs, as long as the fibres yield; the juices find vent ſo as to advance to the ſize of a filbert, walnut, or even a pigeon's egg: ſome are oblong, round, or oval, with an equal or uneven ſurface: ſome of them which are recent, may be eaſily diſperſed; and others, which have been of long ſtanding, hardly yield to any remedies but the knife.

The inſpiſſated matter of a recent ganglion, may often be happily diſperſed by barely rubbing the tumour well every morning with the faſting ſaliva, and binding a plate of lead on it afterwards for ſeveral weeks ſucceſſively. Many attribute a greater diſcutient virtue to the lead, when it has firſt had ſome mercury rubbed on it. Foreſtus, and others, adviſe the uſe of a plaſter of ammoniac and mercury, and often to rub them with oil of ſapo. Others write, that a cure may be readily performed, if the patient lays his hand upon a table, and ſtrikes on the tumour with his fiſt: but care ſhould be taken not to injure the bones, tendons, or other parts of the hand in ſtriking the tumour; and the ſame care muſt be taken if there is a neceſſity of having recourſe to cauſtics or inciſion, in order to remove them.

GANGRENE, a very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt, and put on a ſtate of putrefaction. A gangrene is diſtinguiſhed from a ſphacelus, in as much as this latter is not an incipient but an abſolute and perfect corruption, or death of the parts, already made. See the article SPHACELUS.

A gangrene may be diſcovered generally from the following ſigns; namely, the inflammation, with its ſymptoms, which have all along been very violent, do generally undergo a ſudden change, as if they were going off. The parts which were before ſwelled and tenſe, do now grow ſoft and flaccid, and upon preſſing with the finger on the ſkin and fat, its impreſſion remains behind, as in an œdema; at length the cuticula ſeparates from the cutis, often riſing up in bliſters, like thoſe on burns, filled with a reddiſh, yellowiſh, and black humour; and the ſenſe of the limb is in ſome degree diminiſhed. See the article OEDEMA.

The cauſe of a gangrene, as well as a ſphacelus, are either external or internal. Among the internal cauſes are reckoned an

an eryſipelas, and all other inflammations which riſe ſpontaneouſly, and can by no means be diſperſed, nor brought to ſuppuration. Inflammations of this kind uſually proceed from the blood's being too acrimonious, or corrupted by the bile, or in a ſcorbutus; or when the circulation of the blood is too quick, or too ſlow, by reaſon of old age, or any other weakneſs; or, laſtly, when the patient uſes a perverſe courſe of life with reſpect to diet, and paſſions of the mind, eſpecially anger, grief, and fear, during the time of the inflammation. By external cauſes are intended injuries of the air, cold water, and the application of topical remedies externally to the inflamed parts; which are either cooling, aſtringent, fat, oily, or the like; together with all great external hurts or accidents, which frequently happen to the body through falls, blows, &c. as in wounds, fractures, luxations, &c. See WOUND, FRACTURE, and LUXATION.

A gangrene is for the generality never without danger, becauſe it eaſily changes into a ſphacelus, or intire mortification, which never admits of cure but by taking off the dead parts. But a gangrene which is ſlight, incipient, and not ſpread far, but only affects the ſkin and fat, is not very difficult to cure; eſpecially when it happens in a young and ſtout patient, in a mild and temperate ſeaſon, and does little or no injury to the muſcles and nerves: but the larger, more violent, and confirmed is the gangrene, and the faſter it ſpreads, the more difficult it is generally to effect a cure, eſpecially in an old or weak patient; or in an ill habit of body, from a dropſy, phthiſis, or ſcorbutus: the weather alſo being too hot, or very cold, or the parts affected being near the thorax, or abdomen, may make the caſe more dangerous. Nor can this caſe be neglected without the utmoſt danger of life, or its ſuddenly turning into a ſphacelus.

Therefore the gangrene muſt be treated ſo, that it may not terminate in a ſphacelus. For which end, firſt of all, in plethoric and ſtrong habits, the patient muſt be bled largely, and the operation repeated at diſcretion; but in weak habits, it ſhould be omitted. The remainder of the treatment, according to Heiſter, will conſiſt chiefly in obſerving the following directions. 1. To be careful in the beginning to prevent all violent external cauſes of inflammations, too ſtrict a bandage in wounds and fractures, all foreign bodies which are ſtuck in the part, as thorns, ſplinters, &c. improper medicines externally applied, as ointments, oils, and plaſters, with cooling and aſtringent things; all which ſhould be removed as ſoon as poſſible. 2. The next obſervation reſpects chiefly the keeping up the patient's ſtrength, eſpecially in weak and old people. This may be beſt effected by ordering a diet which not only affords good juices, but is alſo well accommodated to the age, conſtitution, and other circumſtances of the patient. In weak and old people, the moſt ſuitable diet will be ſoops, ſtrengthening broths, &c. With reſpect to medicines, the moſt proper are the corroborants, uſually termed cordials, as the ſpirits, eſſences, powders, and electuaries of that tribe; eſpecially made up or mixed with confected alkermes. It will be proper alſo, in this caſe, frequently to apply a ſponge to the noſe or carpal arteries, which has been dipped in hungary water; alſo to bind it to the temples. For patients who are of a more warm, ſanguine, and bilious habit, ſoops and ptiſans mixed with acid juice of citrons or lemons, will be very proper ſtrengtheners; at the ſame time, not neglecting other medicines, which are proper to be uſed in fevers: but the peruvian bark is by many celebrated in this diſorder beyond any other internal medicine. 3. The chief and laſt obſervation concerning the treatment of a gangrene, is chiefly to diſcharge the ſtagnating and corrupted blood from the parts affected as ſoon as poſſible, to prevent the neighbouring parts from being affected thereby.

The principal means to effect this are, 1. To make uſe of proper internal, ſtrengthening medicines. 2. To make ſcarifications on the part affected, by numerous inciſions lengthways, and of a ſufficient depth, in order to diſcharge the ſtagnating and corrupted blood, and to make way for the ingreſs of the virtues of the diſcutient medicines which are applied externally. Laſtly, 3. Diſcutient, ſtimulating, and balſamic fomentations and cataplaſms which reſiſt putrefaction, are to be carefully applied to the diſordered part. See FOMENTATION and CATAPLASM.

The fomentation is to be applied hot, ſeveral times in a day, to the parts affected, by means of linen or woollen cloths; and to give a laſting warmth, we

we may apply a hot tile wrapped up in a thick cloth, or a hot bag of fand.

GANNET, in ornithology, a bird of the larus or gull-kind, frequent on the weftern coafts of England.

It is equal in fize to the common duck. The upper part of the body is of a deep rufty ferrugineous colour, much like that of the common buzzard; and the breaft and belly are alfo brown, but paler. It is an extremely fingular fpecies, its whole afpect, in fome degree, approaching to that of fome of the larger birds of prey. See plate CX. fig. 2.

GANTLET, or GAUNTLET, a large kind of glove, made of iron, and the fingers covered with fmall plates. It was formerly worn by cavaliers, when armed at all points.

GANTLET, in furgery, a kind of bandage for the hand. See BANDAGE.

It confifts of a fwathe four or five yards long, with which they wrap up the hand, and all the fingers, one after another.

GAOL, a prifon or place of legal confinement.

Every county has two gaols, one for debtors, which may be wherever the fheriff pleafes; the other for the peace and matters of the crown, which is the county gaol.

If a gaol be out of repair, or infufficient, &c. juftices of peace, in their quarter feffions, may contract with workmen for the rebuilding or repairing it; and by their warrant order the fum agreed on for that purpofe, to be levied on the feveral hundreds and other divifions in the county by a juft rate, 11 & 12 Will. III. c. 19. See the article PRISON.

GAOL-DELIVERY, is where a commiffion or patent is granted by the king in the nature of a letter, to certain perfons, who are thereby appointed his juftices, or to two or three of them, authorifing them to deliver his gaol, at fuch a place, of the prifoners contained therein; and for that end it commands them to meet at fuch place, at the time they themfelves fhall appoint, when the fheriff of the county is commanded to bring all the prifoners in the gaol before them, &c. 4 *Inft.* 168. The juftices of gaol-delivery are impowered by the common law to proceed upon indictments of felony, trefpafs, &c. and to order execution or reprieve; they may likewife difcharge fuch prifoners, as on their trials are acquitted, and thofe againft whom, on proclamation made, no evidence has appeared: they have authority to try offenders for treafon, and to punifh many particular offences by ftatute 2 Hawk. 24. 2 Hale's hift. Placit. Cor. 35.

GAOL *Fever*, the fame with that termed hofpital-fever. See the article HOSPITAL-FEVER.

GAOLER, the keeper of a gaol or prifon. Sheriffs are to make fuch gaolers for whom they will be anfwerable: but if there be any default in the gaoler, an action lies againft him for an efcape, &c. yet the fheriff is moft ufually charged. 2 *Inft.* 592. Where a gaoler kills a prifoner by hard ufage, it is felony. 3 *Inft.* 52. No fee fhall be taken by gaolers, but what is allowed by law, and fettled by the judges, who may determine petitions againft their extortions, &c. 2 Geo. II. c. 22.

GAP, a city and bifhop's fee of Dauphine, in France, eighteen miles weft of Embrun: eaft longitude 5° 46′, north latitude 44° 32′.

GARBE, in heraldry, a fheaf of any kind of grain, borne in feveral coats of arms, and faid to reprefent fummer, as a bunch of grapes does autumn.

GARBLER *of fpices*, an antient officer in the city of London, who is authorized to enter into fhops, ware-houfes, &c. there to view and fearch drugs, fpices, &c. and fee that they be garbled or cleanfed from the drofs and duft wherewith they are mixed.

GARBLING *of bow-ftaves*, the forting them, or feparating the good from the bad.

GARBOARD-STRAKE, the plank next the keel of a fhip, one edge of which is run into the rabbit made in the upper edge of the keel on each fide.

GARCINIA, in botany, a genus of the icofandria-monogynia clafs of plants, called magoftans by Garcias, from whom Linnæus has given it the name of garcinia.

The flower confifts of four roundifh, patent petals; and the fruit is a large unilocular, coriaceous berry, containing eight hairy and flefhy feeds, convex on one fide, and angular on the other.

GARDA, a town of the Veronefe, in Italy fubject to Venice: eaft long. 11°, north lat. 45° 25′.

GARDANT, or GUARDANT, in heraldry, denotes any beaft full faced, and looking right forward. See plate CXI. fig. 4. which reprefents a lion gardant.

GAR-

GARDELEBEN, a town of Brandenburg, in Germany: eaft long. 11° 45′, north lat. 52° 40′.

GARDEN, a plot of ground, cultivated and properly ornamented with a variety of plants, flowers, fruit, *&c.*

Gardens are ufually diftinguifhed into flower-garden, fruit-garden, and kitchen-garden; the firft of which, being defigned for pleafure and ornament, is to be placed in the moft confpicuous part, that is, next to the back front of the houfe; and the two latter, being defigned for ufe, fhould be placed lefs in fight. But tho' the fruit and kitchen-gardens are here mentioned as two diftinct gardens, yet they are now ufually in one; and that with good reafon, fince they both require a good foil and expofure, and equally require to be placed out of the view of the houfe. See KITCHEN-GARDEN.

In the choice of a place proper for a garden, the moft effential points to be confidered are the fituation, the foil, the expofure, water and profpect.

1ft, As to the fituation, it ought to be fuch a one as is wholefome, and in a place neither too high nor too low; for if a garden be too high, it will be expofed to the winds, which are very prejudicial to trees; and if it be too low, the dampnefs, the vermin, and the venomous creatures that breed in ponds and marfhy places, add much to their infalubrity. The moft happy fituation is on the fide of a hill, efpecially if the flope be eafy, and in a manner imperceptible; if a good deal of level ground be near the houfe; and if it abounds with fprings of water; for, being fheltered from the fury of the winds, and the violent heat of the fun, a temperate air will be there enjoyed; and the water that defcends from the top of the hill, either from fprings or rain, will not only fupply fountains, canals, and cafcades for ornament, but when it has performed its office, will water the adjacent valleys, and, if it be not fuffered to ftagnate, will render them fertile and wholefome. Indeed if the declivity of the hill be too fteep, and the water be too abundant, a garden on the fide of it may frequently fuffer, by having trees torn up by torrents and floods; and by the tumbling down of the earth above, the walls may be demolifhed, and the walks fpoiled. It cannot, however, be denied, that the fituation on a plain or flat, has feveral advantages which the higher fituation has not: for floods and rain commit no damage; there is a continued profpect of champaigns, interfected by rivers, ponds and brooks, meadows and hills covered with woods or buildings; befides, the level furface is lefs tirefome to walk on, and lefs chargeable, than that on the fide of an hill, fince terrace walks and fteps are not there neceffary: but the greateft difadvantage of flat gardens, is the want of thofe extenfive profpects which rifing grounds afford.

2dly, A good earth, or foil, is next to be confidered; for it is fcarce poffible to make a fine garden in a bad foil; there are indeed ways to meliorate ground, but they are very expenfive; and fometimes when the expence has been beftowed of laying good earth three feet deep over the whole furface, a whole garden has been ruined, when the roots of the trees have come to reach the natural bottom. To judge of the quality of the foil, obferve whether there be any heath, thiftles, or fuch-like weeds growing fpontaneoufly in it; for they are certain figns that the ground is poor. Or if there be large trees growing thereabouts, obferve whether they grow crooked, ill-fhaped, and grubby, and whether they are of a faded green, and full of mofs, or infefted with vermin; if this be the cafe, the place is to be rejected: but, on the contrary, if it be covered with good grafs fit for pafture, you may then be encouraged to try the depth of the foil. To know this, dig holes in feveral places, fix feet wide, and four feet deep; and if you find three feet of good earth it will do very well; but lefs than two, will not be fufficient. The quality of good ground is neither to be ftony, nor too hard to work; neither too dry, too moift, nor too fandy and light; nor too ftrong and clayey, which is the worft of all for gardens.

3dly, The next requifite is water, the want of which is one of the greateft inconveniencies that can attend a garden, and will bring a certain mortality upon whatever is planted in it, efpecially in the greater droughts that often happen in a hot and dry fituation in fummer; befides its ufefulnefs in fine gardens for making fountains, canals, cafcades, *&c.* which are the greateft ornaments of a garden.

4thly, The laft thing to be confidered, is the profpect of a fine country; and tho' this is not fo abfolutely neceffary as water, yet it is one of the moft agreeable beauties

ties of a fine garden: befides, if a garden be planted in a low place that has no kind of profpect, it will not only be difagreeable, but unwholefome.

In the laying out and planting of gardens the beauties of nature fhould always be ftudied; for the nearer a garden approaches to nature, the longer it will pleafe. The area of a handfome garden, may take up thirty or forty acres, but not more; and the following rules fhould be obferved in the difpofition of it. There ought always to be a defcent of at leaft three fteps from the houfe to the garden; this will render the houfe more dry and wholefome, and the profpect on entering the garden more extenfive. The firft thing that fhould prefent itfelf to view, fhould be an open lawn of grafs, which ought to be confiderably broader than the front of the building; and if the depth be one half more than the width, it will have a better effect: if on the fides of the lawn there are trees planted irregularly, by way of open groves, the regularity of the lawn will be broken, and the whole rendered more like nature. For the conveniences of walking in damp weather, this lawn fhould be furrounded with a gravel walk, on the outfide of which fhould be borders three or four feet wide, for flowers: and from the back of thefe the profpect will be agreeably terminated by a flope of ever-green fhrubs, which, however, fhould never be fuffered to exclude agreeable profpects, or the view of handfome buildings. Thefe walks may lead thro' the different plantations, gently winding about in an eafy natural manner, which will be more agreeable than either thofe long ftraight walks, too frequently feen in gardens, or thofe ferpentine windings, that are twifted about into fo many fhort turns, as to render it difficult to walk in them: and as no garden can be pleafing where there is a want of fhade and fhelter, thefe walks fhould lead as foon as poffible into plantations, where perfons may walk in private, and be fheltered from the wind. Where the borders of the gardens are fenced with walls or pales, they fhould be concealed with plantations of flowering-fhrubs intermixed with laurels, and other ever-greens, which will have a good effect, and at the fame time conceal the fences, which are difagreeable, when left naked and expofed to the fight. Groves are the moft agreeable parts of a garden, fo that there cannot be too many of them; only that they muft not be too near the houfe, nor be fuffered to block up agreeable profpects. To accompany parterres, groves opened in compartments, quincunxes, and arbour-work with fountains, *&c.* are very agreeable. Some groves of ever-greens fhould be planted in proper places, and fome fquares of trees of this kind may alfo be planted among the other wood. See QUINCUNX, *&c.*

Narrow rivulets, if they have a conftant ftream, and are judicioufly led about a garden have a better effect than many of the large ftagnating ponds or canals, fo frequently made in large gardens. When wilderneffes are intended, they fhould not be cut into ftars and other ridiculous figures, nor formed into mazes or labyrinths, which in a great defign appear trifling. Buildings, ftatues, and vafes, appear very beautiful; but they fhould never be placed too near each other: magnificent fountains are alfo very ornamental; but they ought never to be introduced, except there be water to keep them conftantly running. The fame may alfo be obferved of cafcades and other falls of water. See the articles CASCADE, FOUNTAIN, *&c.*

In fhort, the feveral parts of a garden fhould be diverfified; but in places where the eye takes in the whole at once, the two fides fhould be always the fame. In the bufinefs of defigns, the aim fhould be always at what is natural, great and noble. The general difpofition of a garden, and of its parts, ought to be accommodated to the different fituations of the ground, to humour its inequalities, to proportion the number and forts of trees and fhrubs to each part, and to fhut out from the view of the garden no objects that may become ornamental. And before a garden is planned out, it ought ever to be confidered, what it will be when the trees have had twenty years growth.

GARDENING, a branch of agriculture, containing the cultivation of gardens. See the preceding article.

The art of gardening affords a variety of delights. It teaches how to difpofe fruit-trees, flowers, and herbs to the beft advantage, whether for profit or pleafure; and fhews how to prepare the foil for fowing the different kinds of feeds, as well as how to treat the plants when grown up. It is a pleafure to behold a perfon employed, among the plants of a fpa-

cious garden, in reforming, by proper methods, a growth of natural wildings; to see him cultivate mutual alliances between his plants, by grafting or inoculation, whereby the bad are meliorated, and the good rendered still more perfect. By this means, a plant taken from the wilds of a forest, softens its savage nature, and will sometimes divest itself of its thorns, when it happens to be associated with a domestic one.

As to the several parts and operations of gardening, the reader will find them described under the articles SOWING, PLANTING, TRANSPLANTING, GRAFTING, INOCULATION, PRUNING, NURSERY, HOT-BED, GREEN-HOUSE, WALK, TERRACE, ALLEY, AVENUE, ARBOUR, GROVE, ESPALIERS, STANDARDS, &c.

GARDENING *a hawk*, in falconry, the putting her on a turf of grass to cheer her.

GARGANEY, in ornithology, a bird of the anas or duck-kind, about the size of the common teel, which in many particulars it greatly resembles. It is distinguished by a green spot in the wings, and a white line over the eyes. See ANAS.

GARGARISM, in medicine, is sometimes taken, in a large sense, for every collution of the mouth; but strictly speaking, it signifies a liquid medicine, appropriated to affections of the mouth, gums, fauces, larynx, and sometimes of the head, received into the mouth, and there used by way of collution, without deglutition.

Gargarizations, according to Celsus, are made for the sake of alleviation, repression, or evacuation. The first intention is answered by milk and cremor of ptisan, or bran; repression is effected by water wherein lentiles, roses, brambles, quinces or dates have been bottled; and evacuant gargarisms are mustard and pepper.

GARIDELLA, FENNEL-LEAVED NIGELLA, in botany, a genus of the decandria-trigynia class of plants. It has no flower petals; but there are five long, equal, and bilabiated nectaria: the fruit consists of three oblong, compressed, acuminated capsules, formed of two valves, and containing numerous small seeds.

GARLAND, a sort of chaplet made of flowers, feathers, and sometimes precious stones, worn on the head, in manner of a crown.

GARLAND also denotes ornaments of flowers, fruits, and leaves, intermixed, antiently much used at the gates of temples, where feasts and solemn rejoicings were held; or at any other place where marks of public joy or gaiety were required, as at triumphal arches, tournaments, &c.

The flowers and greens whereof garlands were composed, were various. The antients made no public entertainment but upon the festivals of the gods; and then the garlands, hymns and songs, were that part of the entertainment the gods were supposed to delight in, according to Athenæus. And in later ages of antiquity, upon the public festival of any god, they used that particular herb or flower supposed to be sacred to that deity: but, at other times, all such herbs were made use of as the season would best admit of, or as they thought were most conducive to pleasure, health, or refreshment. Garlands were not confined to the head only, but other parts of the body, particularly the breast, were adorned with them.

GARLIC, *allium*, in botany, a genus of the hexandria-monogynia class of plants; the corolla whereof consists of six, oblong, concave, erect petals; the fruit is a very short, broad capsule, of a trilobated figure, consisting of three valves, and containing three cells; the seeds are numerous, and of a roundish figure.

This genus comprehends the common garlic, the yellow moly, the onion, the leek, and the long onion.

The several species of this genus agree in medicinal virtues with the cepa, or onion. See the article CEPA.

GARNET, *granatus*, in natural history, a very beautiful gem, of a red colour, with an admixture of bluish.

When pure and free from blemishes, it is little inferior, in appearance, to the oriental ruby, tho' only of a middle degree of hardness between the saphire and common crystal. It is found of various sizes, from that of a pin's head to an inch in diameter.

Among our lapidaries and jewellers, genuine garnets are known by different names, according to their different degrees of colour. 1. The garnet, simply so called, is the finest and most valuable kind, being of a very deep blood-red, with a faint admixture of blue. 2. The rock-ruby, a name very improperly given to the garnet, when it is of a very strong but not deep red, and has a fairer cast of the

the blue: this is a very beautiful gem. 3. The forane or ferain garnet, that of a yet brighter red, approaching to the colour of native cinnabar, with a faint blue tinge. 4. The almandine, a garnet only a little paler than that called the rock-ruby.

Garnets are very properly diftinguifhed into the oriental and occidental kinds, as being found in Europe as well as the Eaft Indies. The oriental ones are principally brought from Calicut, Cananor, and Cambay; and the european ones are common in Italy, Hungary, and Bohemia. Some authors have fuppofed the deeper-coloured garnet to be the fame with the carbuncle of the antients, from which it really differs; fince, on receiving the fun's beams, it never gives fo true a fire-colour as the carbuncle. See the article CARBUNCLE.

Counterfeit GARNET, or GARNET-PASTE, a preparation of glafs, the colour of which emulates that of the genuine garnet. See the article GLASS.

This pafte is made three different ways. 1. By mixing two ounces of prepared cryftal with fix of common red-lead, and adding fixteen grains of manganefe, and three grains of zaffer. 2. By adding $5\frac{1}{2}$ ounces of minium to two of cryftal, and then mixing with them fifteen grains of manganefe, and four grains of zaffer. 3. By mixing five ounces of minium with two ounces of prepared cryftal, and adding fifty-two grains of manganefe, and fix grains of zaffer. This laft makes by far the moft elegant garnet-pafte.

GARNET, in a fhip, is a tackle having a pendant coming down from the main-maft, with a block well feized to the main ftay, juft over the hatch-way, to which a guy is fixed to keep it fteady; and at the other end is a long tackle-block, in which the fall is reeved, that fo by it any goods or cafks may be hauled and hoifted into or out of the fhip. When this garnet is not ufed, it is faftened along the ftay.

Clew GARNET, in a fhip. See CLEW.

GARNISH, in law-books, fignifies to warn; in which fenfe, to garnifh the heir, is mentioned in ftat. 27 Eliz. c. 3. See the article GARNISHMENT.

GARNIHSEE, is ufed for the third perfon or party in whofe hands money is attached within the liberties of the city of London, in the fheriff's court there; and he is fo called, becaufe he has had garnifhment or warning not to pay the money, but to appear and anfwer to the plaintiff creditor's fuit.

GARNISHMENT, is a warning given to a perfon for his appearance, for the better furnifhing of the caufe and court; as where a perfon is fued for detaining charters or other writings delivered him by the plaintiff, and another perfon, upon fome certain conditions; and therefore he prays that the other perfon may be warned to plead with the plaintiff, whether the conditions are or are not performed; which is the praying of garnifhment; and interpreted to be either a warning of that other, or a furnifhing the court with parties fufficient to determine the caufe.

GARONNE, a large river of France, which taking its rife in the Pyrenean mountains, runs north-weft by the city of Tholoufe, divides the provinces of Guienne and Gafcony, and vifiting the city of Bourdeaux, falls into the bay of Bifcay, about fixty miles below that city. It has alfo a communication with the Mediterranean, by means of the royal canal of Lewis XIV.

The tide flows up this river twenty miles above Bourdeaux.

GARRISON, in the art of war, a body of forces, difpofed in a fortrefs, to defend it againft the enemy, or to keep the inhabitants in fubjection; or even to be fubfifted during the winter-feafon: hence, garrifon and winter-quarters are fometimes ufed indifferently, for the fame thing; and fometimes they denote different things. In the latter cafe a garrifon is a place wherein forces are maintained to fecure it; and where they keep regular guard, as a frontier town, a citadel, caftle, tower, &c. The garrifon fhould always be ftronger than the townfmen.

Winter-quarters fignify a place where a number of forces are laid up in the winter-feafon, without keeping the regular guard. See *Winter*-QUARTERS.

GARRISON-TOWN, a ftrong place in which troops are quartered, and do duty, for the fecurity thereof, keeping ftrong guards at each poft, and a main guard in the market-place.

GARRISON, in geography, a town of Ireland, in the county of Fermanagh, and province of Ulfter: weft long. 8° 20′, and north lat. 54° 16′.

GARTER, a ligature for tying up the ftocking; but particularly ufed for the

badge of a noble order of knights, hence denominated the

Order of the GARTER, a military order of knighthood, the most noble and antient of any lay-order in the world, instituted by king Edward III. This order consists of twenty-six knights-companions, generally princes and peers, whereof the king of England is the sovereign, or chief. They are a college or corporation, having a great and little seal.

Their officers are a prelate, chancellor, register, king at arms, and usher of the black rod. They have also a dean with twelve canons, and petty canons, vergers, and twenty-six pensioners, or poor knights. The prelate is the head. This office is vested in the bishop of Winchester, and has ever been so. Next to the prelate is the chancellor, which office is vested in the bishop of Salisbury, who keeps the seals, *&c.* The next is the register, who by his oath is to enter upon the registry, the scrutinies, elections, penalties, and other acts of the order, with all fidelity. The fourth officer is garter, and king at arms, being two distinct offices united in one person. Garter carries the rod and scepter at the feast of St. George, the protector of this order, when the sovereign is present. He notifies the elections of new knights, attends the solemnity of their installations, carries the garter to the foreign princes, *&c.* He is the principal officer within the college of arms, and chief of the heralds. See KING *at arms.*

All these officers, except the prelate, have fees and pensions. The college of the order is seated in the castle of Windsor, with the chapel of St. George, and the chapter-house, erected by the founder for that purpose. The habit and ensign of the order are a garter, mantle, cap, george, and collar. The four first were assigned the knights companions by the founder; and the george and collar by Henry VIII. The garter (see plate CXI. *fig.* 1. n° 1.) challenges preheminence over all the other parts of the dress, by reason that from it the noble order is denominated; that it is the first part of the habit presented to foreign princes, and absent knights, who, and all other knights elect, are therewith first adorned; and it is of so great honour and grandeur, that by the bare investiture with this noble ensign, the knights are esteemed companions of the greatest military order in the world. It is worn on the left leg between the knee and calf, and is enamelled with this motto, HONI SOIT QUI MAL Y PENSE; *i. e.* "shame to "him that thinks evil hereof." The meaning of which is, that king Edward having laid claim to the kingdom of France, retorted shame and defiance upon him that should dare to think amiss of the just enterprize he had undertaken, for recovering his lawful right to that crown, and that the bravery of those knights whom he had elected into this order, was such as would enable him to maintain the quarrel against those that thought ill of it.

The mantle (*ibid.* n° 2.) is the chief of those vestments made use of upon all solemn occasions. The colour of the mantle is by the statutes appointed to be blue. The length of the train of the mantle only distinguishes the sovereign from the knights companions. To the collar of the mantle is fixed a pair of long strings, antiently wove with blue silk only, but now twisted round, and made of Venice gold and silk, of the colour of the robe, with knobs, or buttons, and tassels at the end. The left shoulder of the mantle has from the institution been adorned with a large garter, with the device HONI SOIT, *&c.* within this is the cross of the order, which was ordained to be worn at all times by king Charles I. At length the star was introduced, being a sort of cross irradiated with beams of silver (*ibid.* n° 3.)

The collar (*ibid.* n° 4.) is appointed to be composed of pieces of gold in fashion of garters, the ground enamelled blue, and the motto gold. See COLLAR.

The manner of electing a knight companion into this most noble order, and the ceremonies of investiture, are as follow. When the sovereign designs to elect a companion of the garter, the chancellor belonging to this order draws up the letters, which passing both under the sovereign's sign manual and signet of the order, are sent to the person by garter principal king at arms, and are in this manner, or to the same effect. "We, with the companions of our most "noble order of the garter, assembled "in chapter, holden this present day at "our castle at Windsor, considering "the virtuous fidelity you have shewn, "and the honourable exploits you have "done in our service, by vindicating "and maintaining our right, *&c* have "elected

Fig. 1. Order of the GARTER

N.° 1. N.° 2. N.° 3. N.° 4. N.° 5.

Fig. 2. GORE.

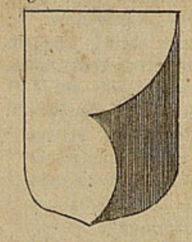


Fig. 3. GIRONNE'.

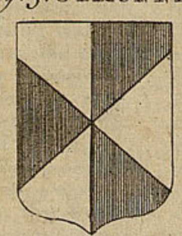
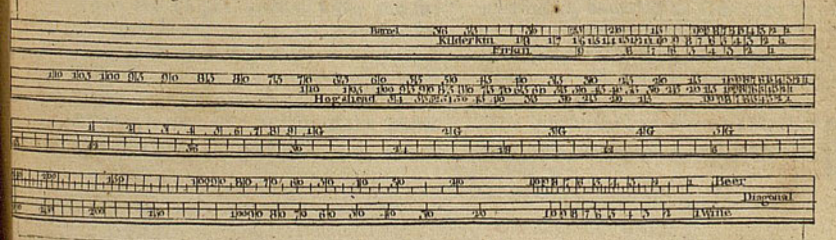


Fig. 4. GARDANT.



Fig. 5. GAUGING ROD.



T. Jefferys sculp.

"elected and chosen you one of the "companions of our order. There- "fore, we require you to make your "speedy repair unto us, to receive the "ensigns thereof, and be ready for "your installation upon the — day of "this present month, &c.

The garter, which is of blue velvet bordered with fine gold wire, having commonly the letters of the motto of the same, is, at the time of election, buckled upon the left leg, by two of the senior companions, who receive it from the sovereign, to whom it was presented upon a velvet cushion by garter king at arms, with the usual reverence, whilst the chancellor reads the following admonition, enjoined by the statutes, "To "the honour of God omnipotent, and "in memorial of the blessed martyr St. "George, tye about thy leg, for thy re- "nown, this noble garter; wear it as "the symbol of the most illustrious or- "der, never to be forgotten, or laid "aside; that thereby thou mayest be ad- "monished to be courageous, and hav- "ing undertaken a just war in which "thou shalt be engaged, thou mayst "stand firm, valiantly fight, and succes- "sively conquer."

The princely garter being thus buckled on, and the words of its signification pronounced, the knight elect is brought before the sovereign, who puts about his neck, kneeling, a sky-coloured ribbon, (*ibid.* n° 5,) whereunto is appendant, wrought in gold within the garter, the image of St. George on horseback, with his sword drawn, encountering with the dragon. In the mean time, the chancellor reads the following admonition: "Wear this ribbon about thy neck, "adorned with the image of the blessed "martyr and soldier of Christ, St. "George, by whose imitation provoked, "thou mayst so overpass both prosperous "and adverse adventures, that having "stoutly vanquished thy enemies both "of body and soul, thou mayst not "only receive the praise of this transient "combat, but be crowned with the "palm of eternal victory."

Then the knight elected kisses the sovereign's hand, thanks his majesty for the great honour done him, rises up, and salutes all the companions severally, who return their congratulations. N° 2. *ib.* exhibits a view of a knight of the garter in the habit of this order.

Since the institution of this order, there have been eight emperors, and twenty-eight kings, besides numerous sovereign princes enrolled as companions thereof. Its origin is somewhat differently related: the common account is, that it was erected in honour of a garter of the countess of Salisbury, which she dropped dancing with king Edward, and which that prince picked up; but our best antiquaries think it was instituted on account of the victory over the French at Cressy, where the king ordered his garter to be displayed as a signal of the battle.

GARTH, signifies a little close, or backside, in the north of England; also a wear. See the article WEAR.

GARTHMAN, a term formerly used for a fisher-man.

GARUM, among physicians, denotes the brine, or pickle, wherein anchovies, herrings, &c. are preserved. See the article PICKLE.

GAS, among chemists, a term made use of by Helmont, to signify, in general, a spirit incapable of coagulation, such as proceeds from fermented wine.

In particular, it has various significations; thus, gas vitale, is the spirit of our life, the light and the balsam, which preserves from corruption. The gas pingue sulphureum is what is suddenly mortal, being lethiferous exhalations arising principally in caves and mines. Gas sulphuris, the gas or spirit of sulphur, is made by burning sulphur under a glass bell set over a vessel of water, till the water is sufficiently impregnated with the sulphur. The gas sylvestre is that invisible and incoercible spirit which arises from vegetable juices under fermentation. Helmont makes several other distinctions of gas; as the gas ventosum, which is mere air; the gas siccum, which is sublimate de flatibus; the gas salium, and the gas fructuum, which are mere elementary water.

GASCOIN, or GASCOIGN, denotes the hinder thigh of a horse, which begins at the stifle, and reaches to the ply or bending of the ham.

GASCONY, the most south-west province of France, bounded by Guienne, on the north; by Languedoc, on the east; by the Pyrenees, which separate it from Spain, on the south; and by the bay of Biscay on the west.

The inhabitants of this province are remarkable for vaunting and pretending to im-

improbabilities; whence the like pretence, in others, is called a gasconade.

GASSENHOVEN, or GUTZENHOVEN, a town of the Austrian Netherlands, fifteen miles east of Louvain: east longitude 5°, and north lat. 50° 55′.

GASTALDUS, or CASTALDUS, an officer antiently entertained in the courts of divers princes.

The gastaldus was what in Italy and Spain is now called major domo, or the master or steward of an houshold. The gastaldus was a comes or count, which shews his office to have been very considerable.

In the laws of Italy we sometimes meet with a gastaldus in the sense of a carrier, and sometimes as an ecclesiastical officer.

GASTEROSTEUS, *banstickle*, in ichthyology, a genus of acanthopterygious fishes, distinguished by having only three small bones in the branchiostege membrane, and the belly almost entirely covered with oblong bony laminæ.

To this genus belong the common stickleback, the lesser stickle-back, and the great stickle-back. See the article STICKLE-BACK.

GASTRO EPIPLOIC VEIN, a vein that opens into the vena portæ. See VEIN.

GASTRIC, in general, something belonging to the stomach. See STOMACH.

GASTRIC JUICE, *gastricus succus*, among physicians, a thin, pellucid, spumous, and saltish liquor, which continually distills from the glands of the stomach, for the dilution of the food. See FOOD.

GASTRIC VESSELS, in anatomy, the arteries and veins of the stomach. See the articles ARTERY and VEIN.

GASTROCNEMIUS, in anatomy, the name of two thick, pretty broad, and oblong muscles, which form a great part of what is called the calf of the leg. They are situated laterally with respect to each other, under the poples.

GASTROCNEMIUS is also the name of one of the extensor-muscles of the foot.

GASTROMANCY, γαστρομαντεία, a method of divination by water, practised by the antient Greeks in the following manner. They filled certain round glasses with fair water, about which they placed lighted torches: then invoked a dæmon, praying in a low, murmuring voice, and proposed the question to be solved. A chaste and unpolluted boy, or a woman big with child, was appointed to observe with great care and exactness, all the alteration in the glasses; at the same time desiring, beseeching, and commanding an answer; which, at length, the dæmon used to return by images in the glasses; which, by reflexion from the water, represented what should come to pass.

GASTRORAPHY, γαστροραφία, in surgery, the operation of sowing up wounds of the abdomen. See ABDOMEN.

There are two cases in which this operation is absolutely necessary; the first is, where the wound is so large, that there is no possibility of retaining the intestines by any other method; for as the intestines are continually pushed forward in the act of inspiration, by the action of the diaphragm and the abdomen, the falling down of the intestines in this case is unavoidable, and therefore the operation is necessary. The other is in large transverse wounds of the abdomen, where the muscles are divided, but the peritonæum is not concerned.

In wounds of the abdomen the chief inquiry is, whether the omentum or intestines are let out. If none of these have burst through the wound, the lips of the wound must be kept as close together as possible with the hands, and the patient kept with his head lying downwards, till the wound is sufficiently secured from letting out the contents of the abdomen. But when the intestines are already fallen out, they must be returned with the greatest expedition, lest they should receive any injuries from the external air. It is first to be examined, however, whether they have received any wound, or not; and whether they preserve their natural warmth and colour: for where they are cold, livid, dry, or wounded, they are not to be returned suddenly, but fomented with warm milk and water, or wraped up for some time in the cawl of some animal newly killed, till they have in some degree recovered their natural heat and colour.

You will easily perceive, that there is some hurt in the intestines, though the wound does not immediately appear, if there is a more than ordinary flaccidity in them; in which case, the rest of the intestines must be pulled gently forward till you find the wound. See the article INTESTINES.

If nothing of this sort is the case, but the intestines are in their natural state and condition, they must be instantly returned

turned in the following manner. The patient being placed in a fupine pofture, and laid on that fide that is oppofite to the wound, the inteftine muft be returned by the aperture of the wound, with the two fore fingers; taking care never to take off one finger, till the other is on the gut. The patient is all the while to hold his breath, and the lips of the wound muft be then brought together. If the inteftines have been forced through a fmall wound, and are afterwards fo diftended with wind, that they cannot eafily be returned, it is neceffary to pull the inteftine gently forward, that more of it may come out, and the wind take up lefs room in any one part. An affiftant fhould then gently dilate the wound as far as may be, either with his hand, or with two hooks fixed in the internal membrane, while the furgeon returns the inteftines. When this is done, the wound muft be fecured firft with the hand, and then with the proper dreffings; and, in this cafe, the furgeon may avoid the ufe of this painful operation. But if the wound is fo narrow, that the gut can neither be reduced nor pulled forward, the aperture muft be enlarged with the knife.

The operation of gaftroraphy, when found neceffary, may be performed in the following manner; firft pafs a ftrong double, or quadruple thread well waxed through too crooked needles, and with thefe ftitch up both ends of the wound, beginning at one end with the upper lip of the wound, paffing the needle through the peritonæum, mufcles of the abdomen, and the common integuments, from within outwards, leaving only the breadth of a thumb between the ftitches, and the mouth of the wound, obferving the fame method in paffing the other needle thro' the lower lip; and, while you are paffing the needle with one hand, it will be proper to fupport the lips of the wound with the other, to prevent the inteftines from being wounded. In a wound of two fingers-breadth, one ftitch in the middle will be fufficient; but in larger wounds the ftitches muft be repeated in proportion to their fize, leaving a thumb's breadth between each of the futures, the extremities of the thread are to be left hanging down on each fide; and when the future is finifhed, while an affiftant holds the lips of the wound together, thefe ends are to be tied in knots, in the following manner. Both ends of the threads are to be taken up, and to be tied in a double knot, paffing a fmall bolfter between the two knots, to prevent the fkin from being hurt. Where there are more futures than one, you muft begin at the upper part of the wound, tying them down in order; that before the laft is tied, a foft tent of the fize of a finger, with a thread faftened to the end of it, may be introduced into the lower part of the wound. This tent will keep a paffage open for the evacuation of grumous blood, or matter, which may be collected in the cavity of the abdomen. The wound, when all this is done, muft be anointed with fome vulnerary balfam, and covered with pledgits of lint, a fticking plafter, and bolfters, fecuring all with the fcapulary bandage.

GASTROTOMY, γαςροτομια, in furgery, the cutting open the abdomen and uterus, as in the cæfarian fection. See the article Cæsarian.

GATE, in architecture, a large door, leading, or giving entrance into a city, town, caftle, palace, or other confiderable building: or a place giving paffage to perfons, horfes, coaches, or waggons, &c. As to their proportion, the principal gates for entrance thro' which coaches and waggons are to pafs, ought never to be lefs than feven feet in breadth, nor more than twelve, which laft dimenfion is fit only for large buildings. The height of a gate is to be $1\frac{1}{2}$ of the breadth, and fomewhat more; but as for common gates in inns, under which waggons go loaded with hay, ftraw, &c. the height of them may be twice their breadth.

Paled Gates, fuch as are fet up in fences for fhutting up the paffages into fields, and other inclofures.

Thefe are of two forts, either of fawed or cleft timber.

Opening of the Gates in aftrology. See the article Opening.

Gate, in the manege, the going or pace of a horfe.

Gate *of the fea*, or Sea-gate, in the fea-language. When two fhips are aboard one another, by means of a wave or billow, it is ufual to fay they are aboard one another in a fea-gate.

Gate, in geography, a chain of mountains that run through the middle of the hither Peninfula of India, from fouth to north.

GATHER, in the fea-language, is faid of

of a ſhip that gets the wind of another.

GATTON, a borough town of Surry, fixteen miles ſouth of London, which ſends two members to parliament.

GAVEL, or GABLE, among builders. See the article GABLE.

GAVELET, in law, an antient and ſpecial ceſſavit uſed in Kent, where the cuſtom of gavel-kind continues, by which the tenant, if he withdraws his rent and ſervices due to the lord, forfeits his lands and tenements.

In reſpect to this gavelet the lord was to ſeek by award of his court from three weeks to three weeks, to find ſome diſtreſs upon the lands, until the fourth court; and if in that time he could find no diſtreſs on the premiſes whereby he might have juſtice of his tenant: then, at the fourth court, it was awarded, that the lord ſhould take the lands, &c. into his hands, in the name of a diſtreſs, and keep it a year and a day without manuring, in which ſpace of time, if the tenant did not come and pay his arrearages, and make the lord amends, then the lord was to go to the next county-court with his witneſſes of his own court, and pronounce there the proceſs; after which, by the award of his own court, he became entitled to enter and manure thoſe lands or tenements as his own. And if the tenant wanted to re-enjoy his lands, &c. as he did before, he was then obliged to make agreement with the lord for the ſame.

GAVELET, in London, is a writ uſed in the huſtings, given to lords of rents in the city of London.

GAVELKIND, a tenure or cuſtom belonging to lands in the county of Kent, by which the lands of the father are, at his death, equally divided among all his ſons; or the land of a deceaſed brother, in caſe he leaves no iſſue, among all the brethren. This is by ſome called antient ſoccage-tenure: the cuſtom came from our ſaxon anceſtors, among whom the inheritance of lands did not deſcend to the eldeſt, but to all the ſons alike; and the reaſon why it was retained in Kent is, becauſe the kentiſh men were not conquered by the Normans in the time of William I.

The particular cuſtoms attending this tenure are, that the heir, at the age of fifteen, may give or ſell his lands in gavelkind; and though the father is attainted of treaſon and felony, and ſuffers death, the ſon ſhall inherit. A wife ſhall be endowed of a moiety of the gavelkind-lands, of which her huſband died ſeiſed, during her widowhood. Likewiſe a huſband may be tenant by curteſy of half his wife's lands, without having any iſſue by her; but if he marries again, not having iſſue, he forfeits his tenancy.

GAVELMAN, a tenant liable to pay tribute.

GAVELMED, the duty of mowing graſs, required by the lord of his cuſtomary tenants.

GAVEREN, or WAVEREN, a town of the Auſtrian Netherlands, ſituated on the eaſt bank of the river Scheld; eaſt long. 3° 35', north lat. 51°.

GAUGE, or GAGE. See GAGE.

GAUGE LINE, on the gauging-rod. See the article GAUGING.

GAUGE-POINT, of a ſolid meaſure, the diameter of a circle, whoſe area is equal to the ſolid content of the ſame meaſure. Thus, the ſolidity of a wine-gallon being 231 cubic inches, if you conceive a circle to contain ſo many inches, the diameter of it will be 17.15; and that will be the gauge-point of wine-meaſure. And an ale-gallon, containing 282 cubic inches, by the ſame rule, the gauge-point for ale-meaſure will be found to be 19.15. After the ſame manner, may the gauge-point of any foreign meaſure be obtained; and from hence may be drawn this conſequence, that when the diameter of a cylinder, in inches, is equal to the gauge-point of any meaſure, given likewiſe in inches, every inch in length thereof will contain an integer of the ſame meaſure, *e. gr.* in a cylinder whoſe diameter is 17.15 inches, every inch in height contains one entire gallon in wine meaſure; and in another, whoſe diameter is 18.95 inches, every inch in length contains one ale-gallon.

GAUGER, a king's officer, who is appointed to examine all tuns, pipes, hogſheads, and barrels of wine, beer, ale, oil, honey, &c. and give them a mark of allowance, before they are ſold in any place within the extent of his office.

There are divers ſtatutes that mention this officer and his office; as by 27 Ed. III. c. 8. all wines, &c. imported are to be gauged by the king's gaugers, or their deputies, otherwiſe they ſhall be forfeited, or their value; and on default of the gauger, that he be not ready to do his office when required, or that he defrauds in doing his office to the damage

of

of the buyer or feller, he fhall pay the party grieved his treble damage, lofe his office, be punifhed by imprifonment, and be ranfomed at the king's will: and in cafe lefs be found in the tun or pipe than ought to be, the value of as much as fhall lack, fhall be deducted in the payment.

Every gauger fhall truly, within the limits of his office, gauge all tuns, butts, pipes, tierces, puncheons, tertians, hogfheads, barrels, and rundlets; and mark on the head of every veffel the contents, upon pain to forfeit to the party to whofe ufe the wine, &c. fhall be fold, four times the value of that which the veffel marked fhall lack of his content: the fame forfeiture fhall be recovered by an original writ, &c. and every perfon felling the wine, &c. in the veffel marked, fhall allow of the price, the value of the lack of gauge, or default of filling, upon pain of forfeiture to the buyer, double the value, to be recovered with cofts as before. No brewer fhall put to fale any beer or ale in veffels brought from beyond the fea, within the city of London, or fuburbs of the fame, or within two miles compafs without the fuburbs, before the fame be gauged, and the true content of every fuch veffel fet upon the fame, by the gallon appointed for beer and ale, according to the ftandard, by the mafter and wardens of the coopers of London.

GAUGING, the art or act of meafuring the capacities or contents of all kinds of veffels, and determining the quantities of fluids or other matters contained therein.

The art of gauging is that branch of the mathematics called ftereometry, or the meafuring of folids; becaufe the capacities of all forts of veffels ufed for liquors, as cubical, parallelopipedal, cylindrical, fpheroidal, conical, &c. are computed as though they were really folid bodies, and reduced thereby to fome known cubic meafure, as gallons, quarts, pints, &c. The principal veffels that come under its operation are pipes, barrels, rundlets, and other cafks; alfo backs, coolers, vats, &c.

The folid content of cubical, parallelopipedal, and prifmatical veffels is eafily found in cubic inches, or the like, by multiplying the area of the bafe by the perpendicular height. And for cylindrical veffels, the fame is found by multiplying the area of the bafe by the perpendicular altitude as before. See the articles CUBE, PARALLELEPIPED, &c.

Cafks of the ufual form of hogfheads, kilderkins, &c. may be confidered as fegments of a fpheroid cut off by two planes, perpendicular to the axis; which brings them to Oughtred's theorem for meafuring ale and wine-cafks, which is thus: add twice the area of the circle at the bung, to the area of the circle of the head; multiply the fum by one third of the length of the cafk, the product is the content of the veffel in cubic inches.

But for accuracy, Dr. Wallis, Mr. Cafwell, and others, think that moft of our cafks had better be confidered as fruftums of parabolic fpindles, which are lefs than the fruftums of fpheroids of the fame bafe and height, and give the capacity of veffels nearer the truth than either Oughtred's method, which fuppofes them fpheroids; or than that of multiplying the circles of the bung and head, into half the length of the cafk, which fuppofes them parabolic conoids; or than that of Clavius, &c. who takes them for two truncated cones, which is fartheft off of all.

The common rule for all wine or ale-cafks, is to take the diameters at the bung and at the head, by which you may find the area of the circle there; then taking two thirds of the area of the circle at the bung, and one third of the area of the circle at the head, and adding them together into one fum; this fum multiplied by the internal length of the cafk, gives the content in folid inches; which are converted into gallons by dividing by 282 for ale, and 231 for wine-gallons.

But gauging, as now practifed, is chiefly done by means of inftruments called gauging-rods or rulers, which do the bufinefs at once, and anfwers the queftion without fo much calculation, which is no inconfiderable addition both to the eafe and difpatch of the work, tho' it is not fo much to be depended on.

The methods of gauging which are moftly ufed, is by the four-foot gauging-rod and Everard's fliding ruler: the defcription and ufes of both are as follows:

The four-foot GAUGING-ROD (plate CXI. fig. 5.) is ufually made of box, and confifts of four rules, each a foot long, and about three eighths of an inch fquare, joined together by three brafs-joints; by which means the rod is rendered four feet long when the four rules are opened, and but one foot when all are folded together.

On

On the first face of this rod, marked 4, are placed two diagonal lines, one for beer and the other for wine; by means of which the content of any common vessel in beer or wine-gallons, may be readily found, by putting the brased end of the gauging-rod into the bung-hole of the cask, with the diagonal lines upwards, and thrust this brased end to the meeting of the head and staves; then with chalk make a mark at the middle of the bung-hole of the vessel, and also on the diagonal lines of the rod, right against or over one another, when the brased end is thrust home to the head and staves; then turn the gauging-rod to the other end of the vessel, and thrust the brased end home to the end as before. Lastly, see if the mark made on the gauging-rod, come even with the mark made on the bung-hole, when the rod was thrust to the other end; which if it be, the mark made on the diagonal lines, will, on the same lines, shew the whole content of the cask in beer or wine-gallons. If the mark made on the bung-hole be not right against that made on the rod, when you put it the other way, then right against the mark made on the bung-hole, make another on the diagonal lines; and the division on the diagonal line, between the two chalks will shew the whole content of the vessel in beer or wine-gallons.

Thus, *e. gr.* if the diagonal line of a vessel be $28\frac{4}{10}$ inches, its content in beer-gallons will be nearly 51, and in wine-gallons 62.

If a vessel be open, as a half barrel, tun, or copper, and the measure from the middle on one side to the head and staves be 38 inches, the diagonal line gives 122 beer-gallons; half of which, *viz.* 61, is the content of the half tub.

If you have a large vessel, as a tun or copper, and the diagonal line taken by a long rule be 70 inches; then every inch at the beginning-end of the diagonal line call 10 inches: thus 10 inches become 100 inches; and every tenth of a gallon call 100 gallons; and every whole gallon call 1000 gallons.

On the second face, 5, are a line of inches and the gauge-line, which is a line expressing the areas of circles (whose diameters are the correspondent inches) in ale-gallons: at the beginning is wrote *Ale-area*. Thus, to find the content of any cylindrical vessel in ale-gallons: seek the diameter of the vessel in inches, and just against it, on the gauge-line, is the quantity of ale-gallons contained at one inch deep: this multiplied by the length of the cylinder, will give its contents in ale-gallons.

On the third face, 6, are three scales of lines; the first, at the end of which is written *Hogshead*, is for finding how many gallons there are in a hogshead, when it is not full, lying with its axis parallel to the horizon. The second line, at the end of which is written *B. L.* is for the same purpose. The third is to find how much liquor is wanting to fill up a butt, when it is standing; at the end of it is wrote *B. S.* signifying, *butt standing*.

Half way the fourth face of the gauging-rod, 7, there are three scales of lines, to find the wants in a firkin, kilderkin, and barrel, lying with their areas parallel to the horizon. They are distinguished by the letters *F. K. B.* signifying a firkin, kilderkin, and barrel.

The use of the lines on the two last faces is very easy; you have only to put it downright into the bung-hole to the opposite staves, if the vessel, you want to know the quantity of ale-gallons contained therein, be lying: and then where the surface of the liquor cuts any one of the lines appropriated to that vessel, and be the number required.

Everard's sliding-rule is principally used in gauging, being ordinarily made of box, a foot long, an inch broad, and $1\frac{6}{10}$ inch thick, with two small scales to slide in it, which may be drawn out, one towards the right hand, and the other towards the left, till the whole be 3 feet long. See plate CXII.

The principal lines on the instrument are those commonly known by the name of Gunter's line, or line of numbers, which are here distinguished one from another by certain letters, set at the end of the lines, towards the right hand: thus the lines D are each of them one single line of numbers, beginning at the end of the rule towards the left hand, and from thence continued to the other end. The lines A, B, and C, are called double numbers, each being two lines or radiuses of numbers; the line E is called triple numbers, being three radiuses of numbers: this triple line is equal in length to the double lines, and all to the single line; for all the five begin and end at the same point. On the line A are four brass center-pins, two in each radius; one in each of which is marked MB, to signify that the number it is set

CXII

EVERARD'S SLIDING RULE.

Faces of the Rule.

1 2 MB A 3 4 5 6 7 si 8 se 9 1 2 MB A 3 4 5 6 7 si 8 se 9 10 A

1 2 W 3 C 4 5 6 7 8 9 1 2 W 3 C 4 5 6 7 8 9 10 B

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 N

2 1 9 8 7 6 5 4 3 2 1 9 8 7 6 5 4 3 MD

Root 1 WG AG 2 3 4 MS 5 MR 6 TP 7 8 9 10 D

Square 1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 C

Root 1 2 3 4 5 6 7 8 9 10 D

Cube 1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 1000 E

Edges of the Rule.

1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100 Seg Ly

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 N

1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100 Seg St

1 2 3 4 5 6 7 8 9 10 11 12

1 2 3 4 5 6 7 Spheroid

1 2 3 4 5 6 2d Variety

1 2 3 4 5 3d Variety

The Inside of ye 3 Sliders.

6 5 4 3 2 1 1 9 8 7 6 5 B

24 23 22 21 20 19 18 17 16 15 14 13 N

6 5 4 3 2 1 3G 9 8 7 6 5 4 3 2 1 2G 9 8 7 C

36 35 34 33 32 31 30 29 28 27 26 25 D

1 2 3 4 5 6 7 8 9 10 11 12 N

1 2 3 4 5 Frusm. Cone 6

J. Lodge sculp.

fet againft, 2150.42, is the cubic inches in a malt-bufhel. The other two are marked with A. to fignify that the numbers they are fet againft, 282, are the cubic inches in an ale-gallon. Clofe to the figure 7, in the firft radius on the fame line, is a dot marked *f i.* fet exactly over .707, denoting .707 to be the fide of a fquare infcribed in a circle, whofe diameter is unity. Clofe to 9 is another dot, marked *f e.* fet over .886, which is the fide of a fquare, equal to the area of a circle, whofe diameter is unity. Another dot nigh W, is fet over 231, the cubic inches in a wine-gallon; and another near C, is fet over 3.141592, the circumference of a circle, whofe diameter is unity. The line marked M D. to fignify *malt-depth,* is no more than a line of numbers in a reverfe order, the number 1 being fet directly againft M. B. on the firft radius, and is of exceeding great ufe in cafting up of malt-gauges.

On the line D. there are four center-pins, the firft, marked W G. is the gauge-point of a wine-gallon, *i. e.* the diameter of a cylinder whofe height is 1 inch, and content 231 cubic inches, or a wine-gallon, which is 17.15 inches. The fecond center-pin, marked A G. ftands at the gauge-point for an ale-gallon, which is 18.95 inches. The third, M S. ftands at 46.3, the fide of a fquare, whofe content is equal to the inches of a folid bufhel. The fourth, M R. is the gauge-point for a malt-bufhel, which is 52.32 inches. The two lines of fegments are each numbered from 1, 2, *&c.* to 100: the firft is for finding the ullage of a cafk taken as the middle fruftum of a fpheroid, lying with its axis parallel to the horizon: and the fecond for finding the ullage of a cafk ftanding.

Again, on one of the narrow fides, noted *e*, are, 1°, a line of inches, numbered 1, 2, 3, *&c.* to 12, and each fubdivided into 10 equal parts. 2°. A line, by which, with that of inches, we find a mean diameter for a cafk, in the figure of a middle fruftum of a fpheroid. 3°. A line for finding the mean diameter of a cafk in the figure of the middle fruftum of a parabolic fpindle, which gaugers call the fecond variety of cafks. 4°. One for the third variety, which is of a cafk in the figure of two parabolic conoids abutting on a common bafe.

On the other narrow face, marked *f.* are, 1°. A foot, divided into 100 equal parts, marked F M. 2°. A line of inches, noted I M. 3°. A line F C. for finding the mean diameter of the fourth variety of cafks, which is the middle fruftum of two cones, abutting on a common bafe. On the backfide of the fliding-piece is a line of inches from 13 to 36, when the two pieces are put endwife; and againft that, the correfpondent gallons, or hundred parts, that any fmall or like open veffel, from 13 to 36 inches diameter, will contain at one inch deep.

The ufes of the fliding-rule in fome parts of arithmetic.

Problem I. Having two numbers given, to find a third geometrically proportional unto them; and to three, a fourth; and to four, a fifth, *&c.*

Find one of the numbers given, upon the line B, and fet it againft the other given number, on the line A; then find the fame number on B (which was laft counted) upon A; and againft this third upon B, is the fourth on A. In like manner, againft the fourth on B, you have the fifth on A, *&c.*

Example. Let it be required to find a third proportional to thefe two numbers, 2 and 4, which may bear the fame proportion to 4, that 4 does to 2?

Draw out the fliding-rod, till 2 upon B ftand againft 4 upon A; then againft 4 upon B is 8 (the third proportional) upon A; and againft this third (*viz.* 8) upon B, is 16 upon A, which is the fourth proportional, *&c.* Contrariwife, if it were required to find a third proportional to the fame numbers, 2 and 4, which may bear the fame proportion to 2, that 2 bears to 4? Set 4 in the fecond radius upon A, to 2 upon B; then againft 2 upon A (towards the left hand) is 1, the third proportional; and againft 1 upon A, is .5, the fourth upon B: alfo againft this fourth upon A, is .25, the fifth proportional on B, *&c.*

Problem II. One number being given to be multiplied by another, to find the product. In multiplication, either of whole numbers, mixed or decimal fractions, the proportion is,

As 1 : the multiplicator : : the multiplicand : the product.

Example. Let it be required to multiply 6 by 4. The proportion then is as 1 : 4 : : 6 : 24. Therefore fet 1 upon the the line B, to 4 upon the line A; then againft 6 upon B, is 24, the product fought, upon A.

Problem III. One number being given to be divided by another, to find the quotient.

tient. In divifion, both of whole numbers and mixed, the proportion is, as the divifor is to 1, fo is the dividend to the quotient.

Example. Let it be required to divide 24 by 4, the proportion is, as 4 : 1 : : 24 : 6. Therefore fet 4 upon B, to 1 upon A; and then againft 24 upon B, is 6 upon A, which is the quotient fought.

Problem IV. Three numbers being given, to find a fourth in direct proportion.

Rule. Set the firft number given upon B, to the fecond upon A, and then againft the third number given upon B, is the fourth number fought upon A.

Example. If 8 quarters of malt will make 20 barrels of fmall beer, how many barrels of fuch beer will 22 quarters make?

Set 8 upon B, to 20 upon A; and then againft 22 upon B, is 55 upon A; and fo many barrels will 22 quarters make.

Problem V. To three numbers given, to find a fourth in an inverfed proportion.

Rule. Set the third number upon A, to the firft (being of the fame denomination) upon B; and then againft the fecond number upon A, you have the fourth upon B.

Example. If 8 men do any piece of work in 9 days, in how many days can 12 men do the fame work?

Set 12 upon A, to 8 upon B; then againft 9 upon A, is 6 upon B, which is the anfwer. For 12 men may do the fame work in 6 days, which 8 men will do in 9 days.

Problem VI. Betwixt two numbers given to find a mean geometrical proportional.

Rule. Set one of the numbers given upon C, to the fame number upon D; and then againft the other given upon C, is the geometrical mean fought upon D.

Example. Let the numbers given be 50 and 72, to find a geometrical mean, *&c.* Set 50 upon C, to 50 upon D; and then againft 72 upon C, is 60 upon D; fo 60 is the geometrical mean betwixt 50 and 72. Or thus, fet 72 upon C, to 72 upon D; and then againft 50 upon C, is 60 upon D, the mean as before.

To find the fquare or cube roots of any number, let the lines C and D for the firft, and D and E for the fecond, be applied to one another, fo that 10 at the end of D be even with 10 at the end of C; and 10 at the end of D be even with 10 at the end of E; the lines in this cafe are like a table, fhewing the fquare or cube roots of any number by infpection; for againft any number upon C, you have the fquare root thereof upon D; and againft any number upon E, you have the cube root thereof upon D: *& e contra.*

The use of the rule in meafuring fuperficies: and firft of a circle.

Problem I. The diameter or circumference of a circle, either being given, to find the other. The circumference of that circle whofe diameter is unity, is 3.141592653 6; but for practice, the four firft figures are fufficient; therefore, as 1 : 3.1415 : : the diameter of any circle to its circumference. By the rule thus, fet 1 on the line A, againft 3.1415 on B; then againft any diameter on the line A, you have the circumference on B: *& e contra.*

Againft	20	you have thefe circumferences	62.851
	30		94.247
	40		125.663
	50		157.079

Or contrariwife againft thefe circumferences	20	you have thefe diameters	6.366
	30		9.549
	40		12.732
	50		15.915

Problem II. The diameter of any circle being given, to find the area (or any part thereof) in inches, or in ale or wine-gallons. 1. For the whole area in inches. The area of a circle is equal to the product, or rectangle, of half the diameter into half the circumference; that is, if half the diameter be multiplied by half the circumference, the product will be the area: thus, when the diameter is 1, the circumference is 3.1415, the half of which is 1.5707, which multiplied by half the diameter (*viz.* .5) the product will be the area of that circle, whofe diameter is 1, *viz.* .785398.

The areas of all circles are in proportion one to another, as the fquares of their diameters: therefore, as the fquare of the diameter of any circle is to the area of that circle, fo is the fquare of the diameter of any other circle to the area thereof. Now as the fquare of 1 is but 1, it muft be as 1 : .785398 : : fquare of the diameter of any circle to the area thereof. So .785398 is a fixed multiplicator; and if an unit with cyphers be divided by .785398, the quotient will be 1.27324, a fixed divifor: and by either of thefe numbers may the area of any circle be found, either by multiplication or divifion. For if the fquares of any diameter be multiplied or divided by thefe numbers, the product or quotient will be

be the area in inches, feet, or yards, according as the diameter was meaſured in inches, feet, *&c.*

But with more expedition by the rule. Set 1 upon the line D, to .785398 upon C. The rule being thus ſet, the lines are like a table of circles, areas to all diameters: for againſt any diameter upon the line D, you have the area thereof upon C. Thus if the diameter is 20, the area is 314.159; if it is 25, the area is 490.87 inches. And on the contrary if the area is 300, the diameter is 19.54; if 400, the diameter is 22.56 inches.

The area in inches divided by 282, the cubic inches in an ale-gallon, or by 231 for wine-gallons, gives the area for either reſpectively; or you may uſe any other diviſor, according to the meaſure you want. But without knowing the inches contained in any area, the area in gallons may be found thus: divide .785398 by 282. the quotient will be .0027851 ale-gallons; or by 231, if for wine-gallons, and it gives .0033999. Theſe numbers are the areas of circles in ale and wine-gallons, whoſe diameters are 1; and are fixed multiplicators for finding the area of all circles in either of theſe meaſures; for if the ſquare of the diameter of any circle be multiplied by either of theſe numbers, the product is the area in ale or wine-gallons reſpectively.

If you would effect this by diviſion, the ſeveral diviſors are thus found: multiply the diviſor for finding the area in inches, *viz.* 1.27324, by 282, or 231, the products 359.05 for ale-gallons, and 294.11 for wine-gallons, are the diviſors ſought. And the ſquare of the diameter of any circle divided by one of theſe, gives the reſpective area.

But the area of any circle may be more readily found by the help of fixed numbers, called gauge-points; and theſe numbers are the diameters of thoſe circles whoſe content, at 1 inch deep, is equal to the reſpective gallon to which they belong. They are the ſquare roots of the diviſions laſt mentioned, that for A. G. 18.95, for W. G. 17.15, on the rule: thus, ſet 18.95 (the gauge-point for ale-gallons) upon D, to 1 upon C; then againſt any diameter upon D, you have the area upon C. The like for wine-gallons, by the proper gauge-point. Note, when the area of any circle is ſought in ale-gallons, if the diameter be more than 18.95 and leſs than 100, ſet the gauge-point upon D, to 1 at the beginning of C. Or when the diameter is leſs than the gauge-point, or more than 100, then ſet the gauge-point to 1, in the middle upon C. Laſtly, to find any part of the area, ſet the gauge-point to $\frac{1}{2}$, or $\frac{1}{4}$, or any other part of 1, then againſt the diameter you have the like part of the area.

From what has been ſaid, it will not be difficult to uſe the rule in gauging the areas of all right-lined figures; and when the area is found, the ſolidity is eaſily obtained. Thus, for example, the diameter, depth, and content of any cylindrical tun, any two being given, to find the third. In this problem are three queſtions, all reſolved at once ſetting the rule: 1. By the depth and content to find the diameter. Example. Suppoſe the depth 40 inches, and the content 1800 ale-gallons, what is the diameter?

Set 40, the depth, upon C, to the gauge-point upon D; then againſt 1800, the content, upon C, is 127.1 inches, the diameter ſought.

2. By the diameter and content, to find the depth, without moving the rule: ſay

As 127.1, the diameter,	upon	D
is to 1800, the content;		C
ſo is the gauge-point to		D
40, the depth,		C

3. By the depth and diameter, to find the content, the rule ſtanding as before: ſay,

As the gauge-point	upon	D
is to 40, the depth,		C
ſo is 127.1, the diameter,		D
to 1800, the content,		C

Note, as a circle is the baſe of a cylinder, ſo a triangle, quadrangle, or any other plane ſuperficies, may repreſent the baſe of a priſm: for if there be planes erected perpendicularly upon the lines which encompaſs any ſuch ſuperficies, they will generate a ſolid, which may be called a priſm; and the content of any ſuch ſolid is found by multiplying the area of the baſe by the altitude, or diſtance from one baſe to another.

The uſe of the rule in GAUGING *of malt.*

The duty upon malt is charged upon the buſhel, and ſo proportionably for greater or leſſer quantities. The buſhel here intended is the Wincheſter-buſhel, which contains 2150.42 ſolid inches, but 2150 will be near enough for practice.

If the area in inches, of any plane figure, be divided by 2150, the quotient ſhews the buſhels and parts of a buſhel, which ſuch a figure or veſſel contains at one inch deep. Example. There is a ciſtern or vat, whoſe baſe is a rectangu-

lar parallelogram, the length is 72 inches, and the breadth 48 inches, what is the area, at 1 inch deep? Anfw. 1.607, that is, 1 bufhel and .607 thoufand parts of a bufhel. For 72 multiplied by 48, is 3456; and this divided by 2150, gives 1.607. But the area of any figure may be more readily found by the lines A and B, upon the rule: thus, as 2150 upon A, is to one of the fides upon B; fo is the other fide upon A, to the area upon B: fo in the example above, fet 2150 upon A, to 72 upon B; then againft 48 upon A, is 1.607 upon B. Or fet 2150 upon A, to 48 upon B; then againft 72 upon A, is 1.607 upon B.

The area thus found, being multiplied by the mean depth in inches, gives the content of fuch a ciftern at that depth and fo for any quantity of malt upon the floor; but care muft be taken in finding the mean depth of any quantity of malt, either in the ciftern or upon the floor, by reafon of the unevennefs of the furface of the malt, and of the bottom of the ciftern or floor upon which it was laid; in order to which, take the depth in 6, 8, or 10 places; and add all thefe depths together, and divide the fum by the number of places in which the depths are taken, the quotient will be the mean depth required.

Barley is fometimes fteeped in round veffels, and the area of a circle in bufhels is thus found: take the diameter in inches, and let the fquare thereof be multiplied by .0003653, or divided by 2737.47, the product or quotient will be the area fought.

Example. Suppofe the diameter of any veffel be 60 inches, this fquared is 3600, and this multiplied by .0003653, or divided by 2737.47, gives 1.315, the area required.

But for any round veffel, the rule gives the area in bufhels by infpection, by help of a certain number called the gauge-point, which in this cafe is 52.32 (being the diameter of a circle, whofe area is 2150, the folid inches in a bufhel). Thus in the example above, the diameter was 60 inches, therefore fet the gauge-point (*viz.* 52.32) upon D, to 1 upon C; then againft 60 upon D, is 1.315, the area upon C. And the rule being thus fet againft any diameter upon D, you have the area upon C.

But a ciftern, couch, or floor-gauge may be more fpeedily and expeditioufly caft up by the line M D, fignifying malt depth. On this line always find the depth of the ciftern, couch, or floor; then fay, as the depth upon the line M D, is to the length or breadth upon B, fo is the length or breadth upon A, to the content in malt-bufhels upon B. Example. Admit a floor whofe length is 160, breadth 132, and depth 8.1 inches, what is the content in malt bufhels?

Operation by the rule.

Set the depth 8.1 on M D, to the length 160 on the line B; then againft the breadth 132 upon A, you have 79.5 upon B, the content in malt-bufhels. Thus,

	M D.	B.	A.	B.
as	8.1 :	160 : :	132 :	79.5
	Depth.	Length.	Breadth.	Content.

Or thus:

	M D.	B.	A.	B.
as	8.1 :	132 : :	160 :	79.5
	Depth.	Breadth.	Length.	Content.

GAULTHERIA, in botany, a genus of the decandria monogynia clafs of plants: the calyx is a double permanent perianthium: the corolla confifts of a fingle bell-fhaped quinquefid petal; the fruit is a roundifh, obtufe, five cornered, depreffed capfule, compofed of five valves, and containing five cells: the feeds are numerous, offeous, and angular.

GAUNT-BELLIED, in the manege, is faid of a horfe whofe belly fhrinks up towards his flanks.

GAUNTLET, or GANTLET. See the article GANTLET.

GAVOTTA, or GAVOTTE, is a kind of dance, the air of which has two brifk and lively ftrains in common time, each of which ftrains are played twice over, the firft has ufually four or eight bars, and the fecond contains eight, twelve, or more. The firft begins with a minim, or two crotchets, or notes of equal value, and the hand rifing; and ends with the fall of the hand upon the dominant or mediant of the mode, but never upon the final, unlefs it be a rondeau: and the laft begins with the rife of the hand, and ends with the fall upon the final of the mode.

Tempi di GAVOTTA is when only the time or movement of a gavotte is imitated, without any regard to the meafure, or number of bars or ftrains.

Little airs are often found in fonatas, which have this phrafe to regulate their motions.

GAURA, in botany, a genus of the octandria-monogynia clafs, the corolla of which confifts of four oblong petals; the

the fruit is an oval, four cornered capſule, containing a ſingle oblong, angular ſeed.

GAURS, in matters of religion, an antient ſect of the magicians in Perſia. They have a ſuburb at Iſpahan, which is called Gaurabad, or the town of the gaurs, where they are employed only in the meaneſt and vileſt drudgery: but they chiefly abound in Kerman, the barreneſt province in all Perſia, where the mahometans ſuffer them to live with ſome freedom, and in the full exerciſe of their religion. Some ages ago many of them fled into India where their poſterity remain to this day.

They are a poor harmleſs ſort of people, zealous in their ſuperſtition, rigorous in their morals, and exact in their dealings: they profeſs the worſhip of one God alone, the belief of a reſurrection, and a future judgment, and utterly deteſt all idolatry, though the mahometans believe them to be the moſt guilty of it. It is true, they perform their worſhip before fire, for which they have an extraordinary veneration, as believing it to be the moſt perfect emblem of the deity. They have the ſame veneration for Zoroaſter that the Jews have for Moſes, eſteeming him a prophet ſent from God.

GAWSE, or GAWZE, in commerce, a very ſlight, thin, open kind of ſtuff, made of ſilk, and ſometimes of thread; there are alſo figured gawzes, and ſome with gold or ſilver flowers on a ſilk ground.

GAZE-HOUND, or GAST-HOUND, one that makes more uſe of his ſight than of his noſe. Such dogs are much uſed in the north of England: they are fitter in an open champain country, than in buſhy and woody places. If at any time a well-taught gaze-hound takes a wrong way, he will return upon a ſignal and begin the chaſe afreſh. He is alſo excellent at ſpying out the fatteſt of a herd, and having ſeparated it from the reſt, will never give over the purſuit till he has worried it to death.

GAZELLA, in zoology, the name of ſeveral ſpecies of goat: as, 1. The african gazella, called alſo antelope and dorcas lybica, the horns of which are cylindric and half way arched. 2. The indian gazella, or antelope, with very long, cylindric, and ſtraight horns, annulated at the baſe. 3. Another ſpecies of african gazella, with cylindric, arched, and perfectly annulated horns. This laſt is a ſmall, but very beautiful ſpecies, and greatly reſembles the common deer in ſhape: the horns, which ariſe from the middle of the forehead, are of a beautiful black colour, and annulated all the way from the baſe to the very tips. See a figure of it in plate CXIII. fig. 1.

GAZETTE, a news-paper, or printed account of the tranſactions of all the countries in the known world, in a looſe ſheet or half ſheet. This name is with us confined to that paper of news publiſhed by authority.

The word is derived from gazetta, a venetian coin, which was the uſual price of the firſt news-paper printed there, and which was afterwards given to the paper itſelf.

GAZONS, in fortification, pieces of freſh earth, covered with graſs, and cut in form of a wedge, about a foot long and half a foot thick, to line the outſides of works made of earth, as ramparts, parapets, *&c.* The firſt bed of gazons is fixed with pegs of wood; the ſecond bed ſhould be ſo laid as to bind the former, by being placed over its joints; and ſo continued till the works are finiſhed. Betwixt theſe beds it is uſual to ſow all ſorts of binding herbs, in order to ſtrengthen the rampart.

GEAR, or *About your* GEAR, in the ſea-language, a word of command to work on all hands.

GEERS, or CHAINS, in country-affairs, the trappings and other harneſs belonging to draught-horſes or oxen.

GEESE, in ornithology. See GOOSE.

GEHENNA, a term mentioned in ſeveral parts of ſcripture, which our engliſh tranſlators have rendered hell. See HELL.

GELÆOPACHIA, in natural hiſtory, a claſs of mineral inflammable fluids, of a thicker conſiſtence, and opake; ſuch is piſſaſphaltum. See PISSASPHALTUM.

GELÆOSPILA, another claſs of inflammable mineral fluids, of a thinner conſiſtence, and pellucid: ſuch is naphtha. See the article NAPHTHA.

GELATINOUS, in pharmacy and medicine, any thing approaching to the glutinous conſiſtence of a gelatina, or jelly.

GELD, in our old cuſtoms, a ſaxon word ſignifying money, or tribute: alſo a compenſation for ſome crime committed. See the article GILD.

Hence wergeld, in our ancient laws, was uſed for the value of a man ſlain; and orfgeld, of a beaſt. See ORFGELD.

Foot-GELD. See the article FOOT-GELD.

Horn-GELD. See the article HORN-GELD.

Wood-GELD. See WOOD-GELD.

GEL-

GELDERLAND, comprehending Zutphen, is a province of the united Netherlands, bounded by the Zuider-fea and Overyffel on the north, by Weftphalia on the eaft, by Brabant on the fouth, and by the province of Utrecht on the weft.

GELDER ROSE, the name by which fome call the opulus, or water-elder.

GELDING, the operation of caftrating any animal, particularly horfes.

This operation confifts in cutting out the tefticles; in performing which, three things are to be obferved: firft, regard is to be had to their age; next, to the feafon of the year; and, laftly, to the ftate of the moon. For the firft, if the operation is to be performed on a colt; he may be gelded at nine or at fifteen days old, if the tefticles be come down, in regard the fooner he is gelt the better it will be for his growth, fhape, and courage; though a horfe may be gelt at any age, if proper care be taken in the cure. As for the fecond, the beft time is about April or May, or elfe about the latter end of September. And for the third, the wane of the moon is the fitteft time for performing this operation.

The manner of gelding is as follows: the beaft being caft down on fome foft place, the operator takes the ftones between his foremoft and his great finger, and flitting the cod, preffes the ftones forth; then taking a pair of nippers, made very fmooth, either of fteel, box, or brafil-wood, he claps the ftrings of the ftones between them, very near to where the ftones are fet on, and preffes them fo hard, that there may be no flux of the blood; then, with a thin, drawing cauterizing iron, made red-hot, fears away the ftone.

This done, he takes a hard plafter made of rofin, wax, and wafhed turpentine, well diffolved together, and melts it on the head of the ftrings: that being done, he fears them, and melts more of the falve, till fuch time as he has laid a good thicknefs of it upon the ftrings.

This being done to one ftone, the nippers are loofened, and the like is done to the other; and the two flits of the cod are then filled with white falt, and the outfide of the cod is anointed with hogs-greafe; and thus they let him rife, and keep him in a warm ftable, without tying him up. If he fwells much in his cods or fheath, they chafe him up and down; and make him trot an hour in a day, and he foon recovers.

The manner of gelding a hog is as follows: the operator, after having made two crofs flits, or incifions, on the midft of the ftones, preffes them out, and anoints the fore with tar. But another more general method, yet fomewhat more dangerous, if not well done, is firft to cut the ftone on the top, and after having drawn that one forth, the operator puts in his finger at the fame flit, and, with a lancet, cuts the fkin between the two ftones, and by that flit preffes out the other ftone. Then having cleanfed out the blood, he anoints the part with frefh greafe: and thus there is but one incifion made in the cod. Boar-pigs ought to be gelt about fix months old; yet they are commonly gelded about three weeks or a month old.

GELDING *of a lamb* may be performed from the age of three days to three weeks or more, in the following manner: one is to hold the lamb between his legs, or in his lap, and turn him on his back, holding his fore-feet upright together (but if any black fpots are feen in his flank, he muft not be cut at all), then the cutter holding the tip of the cod in his left hand, cuts the lap of it an inch quite away; which done, he, with the foremoft fingers and thumbs of both hands, fhould foftly flip down the cod over the ftones, to the belly, and with his teeth, holding the left ftone in his mouth, he draws it foftly out the length of the ftring; after which he is to draw out the other ftone in the fame manner; then he fpits in the cod, and anoints the lamb's flanks with frefh greafe, and fo lets him go, and keeps ftirring him up and down for two or three hours.

GELDERS, a city of Gelderland, fituated twenty-three miles fouth of Nimeguen: eaft longit. 6° 8′ and north lat. 51° 35′.

This city, with the territory about it, was yielded to the king of Pruffia, by the treaty of Utrecht.

GELENHAUSEN, an imperial city of Germany, governed by its own magiftrates; it is fituated nine miles north of Hanau: eaft longit. 8° 50′, and north lat. 50° 15′.

GELOSCOPY, a kind of divination drawn from laughter; or a method of knowing the qualities and character of a perfon, acquired from the confideration of his laughter.

GEM, *gemma*, in natural hiftory, a common name for all precious ftones, of which

which there are two claſſes, the pellucid and ſemipellucid.

The bodies compoſing the claſs of pellucid gems are bright, elegant, and beautiful foſſils, naturally and eſſentially compound, ever found in ſmall detached maſſes, extremely hard, pellucid, and of great luſtre; compoſed of a very firm and pure matter, without any admixture of earthy ſubſtance, giving fire with ſteel, not fermenting with acid menſtruums, and very difficultly calcinable in the fire. Of this claſs there are two genera, the chroſtaſima, and the chroaſtaces. See CHROSTASIMA and CHROASTACES.

The bodies compoſing the claſs of ſemipellucid gems, are ſtones naturally and eſſentially compound, not inflammable nor ſoluble in water, found in detached maſſes, and compoſed of cryſtalline matter, debaſed by earth: however, they are but ſlightly debaſed, and are of great beauty and brightneſs, of a moderate degree of tranſparency, and are uſually found in ſmall maſſes.

Of this claſs there are two orders: the firſt of which conſiſts of the ſemipellucid gems, of but two variegations, and frequently of one plain, ſimple colour; tho' ſometimes veined: this order contains four genera, *viz.* the ſardæ, the chalcedonies, the hydrophanæ, and the pramnion. See the articles SARDA, CHALCEDONY, HYDROPHANÆ, and PRAMNION.

The ſecond order of ſemipellucid gems, conſiſting of thoſe remarkable for their veins, zones, and variegations, contains alſo four genera, *viz.* the achatæ, the onyches, the ſardonyches, and the cameæ. See the articles ACHATES, ONYX, SARDONYX, and CAMÆA.

Many authors, not only among the antients but the moderns, are full of the virtues and medicinal properties of precious ſtones; but their reputation, in this reſpect, is now not a little fallen. Yet as the fragments of ſuch ſtones are ſtill preſerved by the phyſicians in ſome of the moſt celebrated compoſitions, as there are certain chemical preparations made of them, as ſeveral perſons of the greateſt candour and experience have related many conſiderable effects of certain gems, on their own particular obſervations, and, laſtly, as it is no way improbable that ſome of the ſofter ſtones may have ſome conſiderable operations on the human body, it might be imprudent indiſcriminately to exclude from them any medicinal virtue at all. When much the greater part of their traditionary qualities are ſet aſide as fabulous, there will remain ſome on as real and well warranted a footing, as many of our other medicines.

On ſuch conſiderations the excellent Mr. Boyle was induced to give us that extraordinary piece of the origin and virtues of gems, the purport whereof is to ſhew, that ſuch ſtones were originally in a fluid ſtate, or are made up of ſuch ſubſtances as were formerly fluid; and that many of their general virtues are probably derived from the mixture of metalline and other mineral ſubſtances, uſually incorporated with them; while the great variety and the particular efficacy of their virtues, ariſe from ſome happy concurrent ſubſtances of that commixture, *e. g.* the peculiar nature of the impregnating liquor, the proportion wherein it is mixed with the petreſcent juice, and the like.

To ſupport this hypotheſis of the virtues of gems, he ſhews, that ſeveral of them are not ſimple concretions of any petreſcent liquors, but conſiſt alſo of other adventitious parts, which he argues from the ſeparableneſs of ſuch ſubſtances in ſome ſtones, the ſpecific gravity in others, and the different tinctures to be met with in gems of the ſame ſpecies. There may, therefore, be in ſome gems numberleſs adventitious corpuſcles; and there is reaſon to think, that ſome of theſe corpuſcles may be endued with ſeveral properties and medicinal virtues.

The ſtreſs of what is objected to them is this: the mineral ſubſtances they contain are ſo cloſely locked up, that they can communicate nothing to the body, and ſo can have no medicinal operation; being unconquerable by ſo ſmall a heat, as that of the ſtomach, and other parts of the body.

This objection might be plauſible enough to prevent the aſcribing any medicinal virtues to them, *a priori*, but can conclude nothing againſt what is warranted by ſo many facts and obſervations, eſpecially when there are ſeveral particulars that obviate this objection. For a vigorous loadſtone, though frequently harder than many gems, is known to emit copious effluvia; and there are many which have been found to have a manifeſt and inconvenient operation on the body, by being wore in the pocket, or long held in the hand.

" The

" The hydroftatical balance, fays Mr. " Boyle, is of prime ufe in difcerning " genuine gems from counterfeits, which " but too often pafs for true, to the " prejudice of phyficians and their pa- " tients, and the lofs of lapidaries: for " as there are, perhaps, no qualities of " bodies more effential than their pon- " derofity, fo there is fcarce any where- " in impoftures find more difficulty to " make a notable alteration without be- " ing difcovered." See the article HY-DROSTATICAL BALLANCE.

Imitation or counterfeiting of GEMS *in glafs*. The art of imitating gems in glafs, is too confiderable to be paffed without notice; fome of the leading compofitions therein, we fhall briefly mention upon the authority of Neri. See GLASS.

Thefe gems are made of paftes, and are no way inferior to the native ftones, when carefully made and well polifhed, in brightnefs or tranfparency, but want their hardnefs. See the article PASTE.

The general rules to be obferved in making the paftes, are thefe. 1. That all the veffels in which they are made be firmly luted, and the lute left to dry before they are put into the fire. 2. That fuch veffels be chofen for the work, as will bear the fire well. 3. That the powders be prepared on a porphyry-ftone, not in a metal mortar, which would communicate a tinge to them. 4. That the juft proportion in the quantity of the feveral ingredients be nicely obferved. 5. That the materials be all well mixed, and if not fufficiently baked the firft time, to be committed to the fire again, without breaking the pot: for if this be not obferved, they will be full of blifters and air-bladders. 6. That a fmall vacuity be always left at the top of the pot, to give room to the fwelling of the ingredients.

To make pafte of extreme hardnefs, and capable of all the colours of the gems, with great luftre and beauty. Take of prepared cryftal, ten pounds; falt of polverine, fix pounds; fulphur of lead, two pounds; mix all thefe well together into a fine powder; make the whole with common water into a hard pafte; and make this pafte into fmall cakes of about three ounces weight each, with a hole made in their middle; dry them in the fun, and afterwards calcine them in the ftraighteft part of a potter's furnace. After this, powder them, and levigate them to a perfect finenefs on a porphyry, and fet this powder in pots in a glafs-furnace to purify for three days: then caft the whole into water, and afterwards return it into the furnace, where let it ftand fifteen days, in which time all foulnefs and blifters will difappear, and the pafte will greatly refemble the natural jewels. To give this the colour of the emerald, add to it brafs thrice calcined; for a fea-green, brafs fimply calcined to a rednefs; for a fapphire, add zaffer, with manganefe; and for a topaz, manganefe and tartar. All the gems are thus imitated in this by the fame way of working as the making of coloured glaffes; and this is fo hard, that they very much approach to the natural gems.

The colour of all the counterfeit gems made of the feveral paftes, may be made deeper or lighter, according to the work for which the ftones are defigned; and it is a neceffary general rule, that fmall ftones for rings, *&c.* require a deeper colour, and large ones, a paler: befides the colours made from manganefe, verdigreafe, and zaffer, which are the ingredients commonly ufed, there are other very fine ones which care and fkill may prepare. Very fine red may be made from gold, and one not much inferior to that from iron: a very fine green from brafs or copper; a fky-colour from filver; and a much finer one, from the granates of Bohemia.

GEMARA, in jewifh antiquity, a collection of decifions and determinations on the law, wrote after the Mifna was completed.

It was called gemara, or perfection, becaufe it was confidered as fo perfect an explication of the law, that after it no farther additions could be made, or any thing more defired. It is otherwife called the talmud. See TALMUD.

GEMATRIA, or GEMATRIE, in jewifh antiquity. See the article CABBALA.

GEMBLOURS, a town of the auftrian Netherlands, in the province of Brabant, fituated on the river Orne, ten miles north-weft of Namur: eaft long. 4° 30', and north lat. 50° 30'.

GEMELLUS, in anatomy, the name of two mufcles, both of which are fmall, flat and narrow, and fituated almoft tranfverfely one above the other, between the tuberofity of the ifchium and the great trochanter, immediately below the pyriformis, and parted by the tendon of the obturator internus.

The fuperior and fmalleft gemellus is fixed

fixed to the lower part of the spine of the ischium, to the superior part of the small ischiatic notch, and is continued under the acetabulum where it is bent downwards. The inferior and largest gemellus, is fixed to the superior and back part of the tuberosity of the ischium, and bending upwards towards the other line, together with it forms a sort of irregular semicircle.

GEMINATED COLUMN. See the article COLUMN.

GEMINI, the TWINS, in astronomy, one of the twelve signs of the zodiac, the third in order, beginning with aries. See the articles SIGN and ZODIAC.

This constellation, according to different authors, contains from 24 to 89 stars. It is represented by the figure of two twin-children, looking each other affectionately in the face, and supposed to be Castor and Pollux.

GEMMA, *gem*, in natural history. See the article GEM.

Sal GEMMÆ, is the purest and finest fossile salt, and an extremely bright and beautiful fossil. It is considerably hard and firm, and at least as pellucid as rock crystal; but is frequently coloured throughout with a milky-white, which takes off greatly from its lustre; and as crystal is liable to be tinged with red, green and yellow, so as to resemble rubies, sapphires, emeralds, and topazes, so this salt is sometimes tinged with these several colours; but rarely preserves the transparency of crystal under the same circumstances. See the article SALT.

GEMONIÆ SCALÆ, in roman antiquity, a place for executing criminals, not unlike Tyburn with us. It was situated on the Aventine mount, or tenth region of the city; and was, according to some, a place raised on several steps, from whence they precipitated the criminals. But others will have it to have been a kind of dungeon, to which they descended by steps.

GEMUND, a town of Germany, in the circle of Westphalia, and dukedom of Juliers, situated on the river Roer: east long. 6° 15′, and north lat. 50° 34′.

GEMUND, a town of Germany, in the circle of Swabia, and county of Rechsberg, situated on the river Rems: east long. 9° 40′, and north lat. 48° 45′.

GEMUND, a town of Germany, in the circle of Franconia, situated on the river Maine: east long. 9° 45′, and north lat. 50° 8′.

GENA, the CHEEK, in anatomy, that part of the face between the nose and the ears. See the article FACE, *&c.*

GENÆ QUADRATUS. See QUADRATUS.

GENAP, a town of Brabant, situated on the river Dyle, 14 miles south-east of Brussels.

GENDARMES, or GENS D'ARMES, in the french armies, a denomination given to a select body of horse, on account of their succeeding the antient gendarmes, who were thus called from their being completely cloathed in armour.

The king's body guards, the light horse of the royal house, and the musqueteers, are at present reputed to belong to the gendarmerie.

The grand gendarmes are a troop composed of about 250 gentlemen, who guard the king's person. The king himself is their captain, and one of the prime peers their captain-lieutenant, who has under him two lieutenants, three ensigns, three guidons, and other officers. There are besides these, gendarmes of the queen, the dauphin, *&c.*

GENDER, *genus*, among grammarians, a division of nouns, or names, to distinguish the two sexes. See NOUN and SEX.

This was the original intention of gender; but, afterwards, other words which had no proper relation, either to the one sex or the other, had genders assigned them, rather out of caprice than reason; which is at length established by custom. Hence genders vary according to the languages, or even according to the words introduced from one language into another. Thus *arbor*, in latin, is feminine; but *arbre*, in french, is masculine: and *dens*, in latin, is masculine; but *dent*, in french, is feminine. Nay, a gender has sometimes changed in the same language, according to time and occasion. Thus *alvus*, according to Priscian, was antiently masculine, but afterwards became feminine; and *navire*, was antiently feminine in french, but is now masculine.

In english we have no genders; indeed we express the difference of sex by different words; as boar, sow; boy, girl, *&c.* We have also twenty-four feminines distinguished from the males by varying the termination of the female into ess; as actor, actress; prince, princess; heir, heiress, *&c.* and we have a few words in which the feminine is distinguished from the masculines by the termination ix, as executor,

executor, executrix; adminiſtrator, adminiſtratrix, *&c.* which is all our language knows of any thing like genders.

The eaſtern languages as well as the vulgar languages of the weſt, have only two genders, the maſculine and the feminine. The greek and latin have beſides, the neuter, common, and doubtful gender. This laſt indeed is not common, for it properly belongs only to the names of ſome animals, which are promiſcuouſly joined both to maſculine and feminine adjectives, to expreſs their male or female, as bos, canis, ſus, *&c.* They have alſo the epicœne gender, which is not a different one, but ſerves promiſcuouſly for either; including both the kinds under one ſingle gender and termination: thus *vulpes*, a fox, tho' it ſignifies either the male or female, is really of the feminine gender, in latin. And ſo *cuſtodiæ*, watchmen or centinels, are really feminine, tho' they ſignify men. This is common to all languages that have them. The latin and greek, in the neuter gender, do not regard them, having no relation to the male or female ſex, but what fancy gives them, and the termination of certain words.

The oriental languages frequently neglect the uſe of genders; and the perſian language has none at all, which is no diſadvantage; the diſtinction of genders being entirely uſeleſs.

GENEALOGICA ARBOR, or tree of conſanguinity, ſignifies a genealogy or lineage drawn out under the figure of a tree, with its root, ſtock, branches, *&c.* The genealogical degrees are uſually repreſented in circles, ranged over, under, and aſide each other. This the Greeks called ſtemmata, a word ſignifying crown, garland, or the like.

GENEALOGY, γενεαλογια, an enumeration of a ſeries of anceſtors; or a ſummary account of the relations and alliances of a perſon or family, both in the direct and collateral line.

GENEP, a town in the dutchy of Cleeve, in Germany, ſituated on the Nierſe and Maeſe, ten miles weſt of Cleeve: eaſt long. 5° 30′, and north lat. 51° 40′.

GENERAL, an appellation given to whatever belongs to a whole genus. See the article GENUS.

Thus we ſay, general geography, diet, council, averment, iſſue, *&c.* See the articles GEOGRAPHY, DIET, *&c.*

GENERAL OFFICERS, in the army. See the article OFFICER.

GENERAL TERMS, among logicians, thoſe which are made the ſigns of general ideas. See IDEA and ABSTRACTION.

All things that exiſt, Mr. Locke obſerves, being particulars, it might be expected that words ſhould be ſo too in their ſignification: but we find it quite contrary; for moſt of the words that make all languages are general terms. This is the effect of reaſon and neceſſity. For,

Firſt, It is impoſſible that every particular thing ſhould have a diſtinct name, becauſe it is impoſſible to have diſtinct ideas of every particular thing; to retain its name, with its peculiar appropriation to that idea.

Secondly, It would be uſeleſs, unleſs all could be ſuppoſed to have theſe ſame ideas in their minds. For names applied to particular things, whereof I alone have the ideas in my mind, could not be ſignificant or intelligible to another, who is not acquainted with all thoſe particular things which had fallen under my notice.

Thirdly, It would be of no great uſe for the improvement of knowledge: which, tho' founded in particular things, enlarges itſelf by general views, to which things reduced into ſorts under general names, are properly ſubſervient.

In things where we have occaſion to conſider and diſcourſe of individuals and particulars, we uſe proper names: as in perſons, countries, cities, rivers, mountains, *&c.* Thus we ſee that jockeys have particular names for their horſes, becauſe they often have occaſion to mention this or that particular horſe, when he is out of ſight.

Afterwards, obſerving that a great many things reſembling each other in ſhape, and other qualities, we frame a general idea that takes in only the qualities in which thoſe many particulars agree; and to this idea we give the name *man*, for example, in which there is nothing new; that which is peculiar to each individual being left out, and only what is common to all retained. And thus we come to have a general idea, and a general name. By the ſame method the mind proceeds to more general motions and names, as thoſe of animal, ſubſtance, being, thing, and ſuch univerſal terms as ſtand for any ideas whatſoever.

As

As to the signification of general words, it is evident they do not barely signify one particular thing; neither do they signify a plurality. But they signify a genus, kind, or sort of things. See the article GENUS.

GENERAL *of an army*, in the art of war, he who commands in chief. See ARMY.

A general ought to be a man of great courage and conduct, to have great experience, and to be of good quality. His conduct appears in establishing his magazines in convenient places; in examining the country, that he may not engage his troops too far, while he is ignorant of the means of bringing them off; in subsisting them; and in knowing how to take the most advantageous posts, either for fighting or shunning a battle. His experience inspires his army with confidence, and an assurance of victory; and his quality, by creating respect, augments his authority. By his liberality he gets intelligence of the strength and designs of the enemy, and by this means is enabled to take the most successful measures. A general ought likewise to be fond of glory, to have an aversion to flattery, to render himself beloved, and to keep a strict discipline.

The office of a general is to regulate the march and encampment of the army; in the day of battle to choose out the most advantageous ground; to make the disposition of the army; to post the artillery; and where there is occasion, to send his orders by his aids de camp. At a siege, he is to cause the place to be invested; to order the approaches and attacks; to visit the works, and to send out detachments to secure his convoys.

GENERAL *of horse*, and GENERAL *of foot*, are posts next under the general of the army, and these have upon all occasions an absolute authority over all the horse and foot in the army.

GENERAL *of the artillery*, or *Master* GENERAL *of the ordnance*. See the article ORDNANCE.

GENERAL is also used for a particular march, or beat of drum; being the first which gives notice, commonly in the morning early, for the infantry to be in readiness to march.

GENERAL is also used for the chief of an order of monks; or of all the houses and congregations, established under the same rule. Thus we say, the general of the Franciscans, Cistercians, *&c.*

GENERATING LINE, or FIGURE, in geometry, is that by which its motion produces any other plane or solid figure. Thus, a right line moved any way parallel to itself, generates a parallelogram; round a point in the same plane, with one end fastened in that point, it generates a circle. One entire revolution of a circle, in the same plane, generates the cycloid; and the revolution of a semi-circle round its diameter, generates a sphere, *&c.* See the articles CYCLOID, SPHERE, *&c.*

GENERATION, *generatio*, in physiology, the act of procreating and producing a thing which before was not; or, according to the schoolmen, it is the total change or conversion of one body into a new one, which retains no marks of its former state. Thus, we say, fire is generated, when we perceive it to be where before there was only wood, or other fuel: in the same manner, a chick is said to be generated, when we perceive it where before there was only an egg; or, the egg is changed into the form of a chick.

In generation, there is not properly any production of new parts; but only a new modification, or manner of existence, of the old ones.

When almighty God, says Dr. Blair, created the world, he so ordered and disposed of the materies mundi, that every thing produced from it should continue so long as the world should stand. Not that the same individual species should always remain; for they were in process of time to perish, decay, and return to the earth from whence they came; but that every like should produce its like, every species produce its own kind, to prevent a final destruction of the species, or the necessity of a new creation. For which end he laid down certain regulations, by which each species was to be propagated, preserved, and supported, till, in order and course of time, they were to be removed hence: for without that, those very beings which were created at first, must have continued to a final dissolution of all things; which almighty God of his infinite wisdom, did not think fit. But that he might still the more manifest his omnipotence, he set all the engines of his providence to work, by which one effect was to produce another, by means of certain laws or rules, laid down for the propagation, maintenance, and support of all created beings. This his divine providence is

called nature, and these regulations are called the laws or rules of nature, by which it ever operates in its ordinary course; and whatever recedes from that, is said to be preternatural, miraculous, or monstrous.

GENERATION *of animals*. According to Aristotle, the males contain the principle, and the females the matter of generation: for tho' both were furnished indeed, with a seminal liquor, yet the semen of the males alone was prolific. The moderns, on the other hand, as well those who contend for the system of generation from eggs, as they who adopt that of the animalcules in the male-seed, pretend that females have no such seminal liquor at all, and that what was commonly taken for it was some other animal fluid.

There are great and many difficulties which attend the most plausible account of the first formation of the parts of an animal, and the beginning of motion in its fluids: for though both reason and experience convince us, that all the parts of an animal did exist before generation; yet how this matter becomes to assume so very different a form, as that of an embryo, is by no means agreed on.

Harvey is of opinion, that all females are furnished with eggs, and that the embryoes, or young animals, are formed in the same manner as a chick in the egg of any bird. Generation, according to this celebrated physician, is effected wholly by means of the uterus, or womb; which conceives the fœtus by a kind of contagion communicated to it by the male-seed, much in the same way as the load-stone communicates magnetism to iron. This contagion, he thinks, acts not only on the uterus, but is communicated to the whole body of the female, which is altogether prolific; though the uterus, he acknowleges, is the only part that is capable of conceiving the fœtus, just as the brain is alone capable of forming ideas and notions. Agreeably to this doctrine of Harvey, Steno, and other anatomists, have pretended to discover certain eggs in the ovaries or testicles of women; which Mr. Buffon denies to be the case, affirming, that there are no such eggs to be found in the testicles or ovaries of women.

We cannot enter into a detail of the reasonings for and against the system of generation from eggs, and shall therefore only observe, that its advocates pretend to have discovered eggs in all the females on which they made observations, that the largest of those found in women did not exceed the bigness of a pea; that they are extremely small in young girls under fourteen, but that age and commerce with men makes them grow larger; that there are more than twenty such eggs in each ovary or testicle; that they are fecundated in the ovary by the spirituous and volatile part of the male-seed; that they afterwards are detached and fall into the uterus through the fallopian tubes; that here the fœtus is formed of the internal substance of the egg, and the placenta of the exterior part. See the article FOETUS.

Leewenhoek is the author of another system of generation, from animalcules in the male seed. He tells us, he discovered many thousands of these in a drop less than a grain of sand. They are found in the semen of all males whatever, but not in that of females; and are so small, that 3,000,000,000 of them are not equal to a grain of sand, whose diameter is but the hundredth part of an inch. When any of these animalcules gets into an egg, fit to receive it, and this falls into the womb through the fallopian tubes, the humours which distil through the vessels of the womb, penetrating the coats of the egg, swell and dilate it, as the sap of the earth does seed thrown into it. The placenta begins to appear like a little cloud, upon one side of the external coat of the egg; and, at the same time, the spine of the embryo-animalcule is grown so big, as to become visible; and a little afterwards, the cerebrum and cerebellum appear like two bladders; and the eyes stand next goggling out of the head; then the beating of the heart or punctum saliens, is plainly to be seen; and the extremities discover themselves last of all.

These animalcules are of different figures, some like tadpoles, and others like eels. In the semen of a man, and in that of a dog, there have been discovered two different kinds of them, the one supposed to be males, and the other females. Some even pretend to have seen animalcules disengage themselves from the membranes that surround them; and that they then appeared perfectly like men, with legs, arms, *&c.* like those of the human body.

All the advocates for the system of generation

neration from animalcules ſtrongly oppoſe that from eggs. They contend, that theſe animalcules cannot be looked upon as the inhabitants of the ſemen, ſince they were of greater extent than the liquor itſelf, not to mention that no ſuch animals are found in any other liquors of the body; and ſince females have nothing ſimilar to theſe animals, they think it manifeſt that the prolific principle reſides in males. When they are aſked, to what purpoſe ſerves ſuch an immenſe profuſion of human animalcules, they anſwer, that it is agreeable to the ordinary courſe of nature, both in the animal and vegetable part of the creation. They likewiſe ſtrengthen their ſyſtem, by alledging the many examples we have of ſimilar transformation in the inſect-claſs of animals, which, from caterpillars and ſmall worms, become winged animals of the butterfly, or fly kinds.

By this ſyſtem, ſays Mr. Buffon, the firſt woman cannot be ſaid to have contained the whole race of mankind, as being all, according to it, the true poſterity of the firſt man, and in their animalcule ſtate contained only in him. On this principle, he proceeds to invalidate the ſyſtem of generation from animalcules; for ſuppoſing the ſize of a man to be 1, then will that of one of the ſpermatic animalcules be $\frac{1}{1000000000}$; and as a man is to an animalcule of the firſt generation in the ſame ratio that this animalcule is to an animalcule of the ſecond generation, it follows that this laſt will be expreſſed by the fraction $\frac{1}{1000000000000000000}$. In this manner he computes the ſize of the animalcules of ſeveral generations, all ſuppoſed to be living animals, notwithſtanding that their minuteneſs exceeds the power of imagination to conceive; and then tells us, that the ſyſtem of generation from eggs is liable to the ſame objections, whereof the detail may be ſeen in his Hiſt. Natur. tom. 2. p. 157, &c ſeq.

As to Buffon's own ſyſtem, he thinks that every part, both of animals and vegetables, contains an infinite number of organic molecules; that theſe molecules aſſume ſucceſſively different forms, and are put into different motions, according to the circumſtances they are in; but that they are much more numerous in the ſeminal liquors of both ſexes, and the ſeeds of plants, than in other parts; that theſe organic molecules make the matter of nutrition; that this matter is always active, and tends to organization, forming itſelf into different ſhapes, according to the moulds it meets with. When the quantity of this organic matter is but ſmall, as in man, and moſt large animals, generation only takes place at the age of maturity, and even then the number of animals produced is but ſmall. The caſe is juſt the reverſe in animals, which abound with this matter, as in fiſhes and moſt birds.

With reſpect to the generation of mankind, the ſame author thinks it a certain fact, that the male-ſeed is received into the womb of the woman; and that, for this purpoſe, it is highly probable the internal orifice opens during the act of coition. The female-ſeed alſo makes its way into the womb, where being mixed with that of the male, they both together contribute to the formation of the fœtus; which is either male or female, according as the ſeed of the man or woman abounds moſt with organic molecules; and the infant reſembles either the father or mother, according to the different combinations of theſe molecules. Both theſe ſeminal liquors he thinks equally active in the formation of the fœtus, and that they fix and counterbalance each other; the molecules of each parent being thereby determined to form ſimilar parts to thoſe of the individual that furniſhed them, as the head, trunk, arms, legs, &c. He thinks the molecules proceeding from the genital parts fix themſelves firſt; and that the other molecules arrange themſelves ſucceſſively round theſe, in the ſame order which they before occupied in the parent. When a great quantity of the ſeminal liquors of both ſexes is received into the womb, there are formed different ſpheres of attraction, in different parts of theſe liquors; the conſequence of which is, that ſeveral fœtuſes are formed at the ſame time. See VEGETATION.

Nearly a-kin to Mr. Buffon's ſyſtem is that of Mr. Maupertuis, which he has explained in his Venus Phyſique. He obſerves, that all the variety, obſervable among mankind, may have been accidental at firſt; but being once eſtabliſhed in the conſtitution of the parents, they become natural to their poſterity. To illuſtrate this, he gives an inſtance of a ſexdigitary family at Berlin, who had ſix fingers, or ſix toes, and frequently both; and that this peculiarity was tranſ-

mitted

mitted equally by the father and mother, but was loft by alliances with thofe who had but the ufual number of fingers or toes.

He farther obferves, that moft animals, excepting mankind, have ftated feafons for procreation, and that the females go with young fome a longer, others a fhorter time. Mares go from eleven to twelve months; cows and hinds go nine months, as do alfo women; foxes and wolves, five months; and bitches go only feven weeks; cats nine weeks; and rabbits but thirty-one days. Moft birds are hatched in twenty one days; the canary birds, and fome others, are hatched in thirteen or fourteen days. It appears, therefore, that there is an endlefs variety in the time and manner of the generation of animals.

Thofe who defire a more full account of thefe fyftems of generation may confult Harvey, Leewenhoek, Buffon, *&c.*

Parts of GENERATION. The parts of generation, in men, are the tefticles, vafa deferentia, veficulæ feminales, and penis. See the article TESTICLE, *&c.* Thofe, in women, are the pudendum or vulva, the clitoris, nymphæ, vagina, uterus or womb, ovaries, and fallopian tubes.

Equivocal GENERATION. See the article EQUIVOCAL.

GENERATION *of fifhes.* The opinion of moft naturalifts, that the female fifhes firft depofit their fpawn, and that the males afterwards eject the femen upon it, is denied by Linnæus; who thinks it impoffible, that the eggs of any animal fhould be impregnated out of its body. He thinks it much more probable, that the males always eject their femen fome time before the females depofite their fpawn; and that by fwallowing this femen, the fpawn is impregnated in the body of the fifh. Nay, he tells us, that he himfelf faw three or four females, in the fpawning time, gather about the male, and greedily fwallow the femen he ejected. This he obferved in fome fpecies of the efox, pearch, and efpecially the cyprinus; but he recommends farther enquiry to be made on this fubject.

GENERATION *of infects*, no lefs than that of birds, is now certainly known to be from eggs; which the female depofits in places, where, at a proper feafon, they are hatched into animals like their parents; or into maggots or worms, which, after feveral transformations, at laft appear in the form of their parents.

Extraordinary GENERATION. Such is that of polypes, from cuttings or pieces of another polype. See POLYPE.

GENERATION *of plants.* The impregnation of the female palm-tree by the male, has been known in the moft antient times. Herodotus, the father of hiftory, tells us, that the Greeks called fome of thefe trees male, the fruit of which they bound to the other kind, which bears dates; that the fmall flies, wherewith the male abounded, might affift in ripening the fruit of the female tree. The remote age in which Herodotus wrote, fufficiently apologizes for his believing, that what was really brought about by the farina fœcundans of the male-flower, was to be attributed to the infects frequently found therein, and which perhaps frequently carry this farina from the male to the female. The procefs of impregnation, according to Theophraftus, was this: while the male plant was in flower, they cut off a branch of thefe flowers, and fcattered the duft and down therein upon the flowers of the female plant; by which means the female did not caft her fruit, but preferved them to maturity. This has been lately verified at Berlin, where a female palm-tree bore fruit for many years; but the fruit never ripened, and when planted did not vegetate, merely becaufe there was no male-palm in the place: for having procured a branch of male flowers from Leipfic, twenty German miles from Berlin, they fufpended it over the female flowers of their tree; and the experiment fucceeded fo well, that the female tree produced more than an hundred perfectly ripe fruit; and the experiment being repeated, it bore above two thoufand ripe fruit, which being planted produced young trees.

It is in the flowers of vegetables only, that the parts fubfervient to generation are produced; and thefe flowers are either male, female, or hermaphrodite. Male-flowers are thofe poffeffed of the organs of generation, analogous to the male parts of animals: fuch are the ftamina and apices, called by Linnæus, filaments and antheræ. The female flowers are only endowed with parts like thofe, which perform the office of generation in females; and thefe are the piftil and its appurtenances, which Lin-

ctæus divides into three parts, the germen, ftyle, and ftigma. The hermaphrodite flower, which conftitutes the great bulk of the vegetable creation, is poffeffed of all thefe parts in itfelf, and is therefore capable of propagating its fpecies without any foreign affiftance; which, by many incontetible experiments, it has been found neither the male nor female flower fimply is able to do. The impregnation of hermaphrodite flowers, may be performed within their own calyx; but, before a feparate female flower can be fo, the farina fœcundans of the male flower muft neceffarily be conveyed to it thro' the circumambient air; which is the reafon, why the quantity of the produce of fuch plants is much more precarious, than that of plants which have hermaphrodite flowers: for if, during the flowering of thefe feparate male and female plants, the weather proves either very wet or ftormy, their produce of fruit will be very inconfiderable, from the fpoiling or hafty diffipation of the male farina. Thus, independant of frofts, the fruit of the nut and filbert-tree, will be moft numerous in thofe years, in which the months of January, and February are the leaft ftormy and wet, becaufe at that time their flowers are produced. For the fame reafons, a ftormy or wet May deftroys the chefnuts; and the fame weather, in July, prodigioufly leffens the crop of maiz, or indian corn, as its fpikes of male-flowers ftand lofty, and at a confiderable diftance from the female.

Some of the more fkilful modern gardeners put in practice, with regard to melons and cucumbers, the very method mentioned by Theophraftus two thoufand years ago, in regard to the palm-tree. As thefe plants, early in the feafon, are in this climate confined to frames and glaffes, the air in which they grow is more ftagnant than the open air; whereby the diftribution of the farina fœcundans, fo neceffary towards the production of the fruit for the propagation of the fpecies, is much hindered. To obviate the inconvenience thence arifing, they collect the male-flowers when fully blown; and prefenting them to the female ones by a ftroke of the finger, they fcatter the farina fœcundans therein, which prevents the falling of the fruit before it is ripe.

By far the greater part of plants produce hermaphrodite flowers; but fome there are which have feparate male and female-flowers growing from the fame root, as maiz, nettles, box, elm, birch, oak, beech, hazel, hornbeam, plane-tree, pine, fir, cyprefs, cedar, melons, cucumbers, gourds, and feveral others: in many of thefe, the male and female flowers ftand at a confiderable diftance. There are other plants which produce thofe neceffary organs upon different roots, as the palm-tree, hops, the willow-tree, miffletoe, fpinach, hemp, poplar, french and dog's mercury, the yew-tree, juniper, and feveral others. Among thefe, the valifnieria of Linnæus, as to the manner in which its male-flower impregnates the female, is one of the moft fingular prodigies in nature. It grows in rivulets, ditches, and ponds, in many parts of Europe. The male plant, which is continually covered with water, has a fhort ftalk, upon the top of which its flowers are produced. As this top never reaches the furface of the water, the flowers are thrown off from it and come unopened to the furface of the water; where, as foon as they arrive, by the action of the air, they arpand themfelves, and fwim round the female flowers, which are blown at the fame time. Thefe laft have a long fpiral foot-ftalk, by which they attain the furface of the water, and remaining there in flower a few days, are impregnated by the male-flowers detached from the ftalk at the bottom.

It is obfervable, that the operations of nature are carried on moft ufually by certain general laws, from which however fhe fometimes deviates. Thus almoft all plants have either hermaphrodite flowers, or male and female flowers, growing from the fame root, or male and female flowers from different roots; but there are a few of another clafs, which from the fame root furnifh either male and hermaphrodite flowers, or female and hermaphrodite ones: of this kind are the bulberry-tree, the mufa or plantain tree, white hellebore, pellitory, arrach, the afh-tree, and a few others. *Watfon,* in Phil. Tranf. Vol. 47. p. 169—183.

Some object to this theory of the generation of plants, from having obferved fome plants, which were termed female, growing fingly; and though at a very great diftance from any male plants of the fame kind, producing perfect fruits, which grew when fown. Mr. Miller tells

tells us, he himſelf was ſtaggered in his opinion, on having obſerved a female plant of white briony, which grew ſingly in a garden, where there were no other plants of the ſame kind; which nevertheleſs, for ſeveral years, produced berries, which grew and flouriſhed perfectly well. This put him upon examining the plant more carefully than he had done before, when a great many male-flowers were found intermixed with the female ones; and he adds, that he has frequently obſerved the ſame in many other plants, which are generally male and female in diſtinct plants, yet have ſometimes both ſexes on the ſame plant.

From what has been ſaid, it appears very plain, that the embryo of the female flower muſt be impregnated by the farina fœcundans, or male-duſt, in order to render the fruit perfect; but how, or in what manner, it is performed, is what we can only gueſs at; ſince in the generation of animals, our greateſt naturaliſts differ widely, as has been ſhewn above, in their opinions concerning the particular method how it is performed. If, ſays the reverend Dr. Hales, I may be allowed to indulge conjecture, I would propoſe it to the conſideration of naturaliſts, whether, from the manifeſt proof we have that ſulphur attracts air, a hint may not be taken to enquire whether this may not be the primary uſe of the farina fœcundans, to attract and unite with itſelf, elaſtic or other refined active particles. That this farina abounds with ſulphur, and that a very refined ſort, is probable from the ſubtile oil which chemiſts obtain from the chives of ſaffron: and if this be the uſe of it, was it poſſible that it could be more aptly placed than on the ſlender points of the ſtamina, where it might eaſily, with the leaſt breath of wind, be diſperſed in the air; thereby ſurrounding the plant, as it were, with an atmoſphere of ſublimed ſulphureous pounce? Theſe uniting with particles of air, may, perhaps, be inſpired at ſeveral parts of the plant, and eſpecially at the piſtil, and be thence conveyed to the capſula ſeminalis. And if to theſe united ſulphureous and aerial particles, we ſuppoſe ſome particles of light to be joined (for Sir Iſaac Newton has found that ſulphur attracts light ſtrongly); then the reſult of theſe three by far the moſt active principles in nature will be a punctum ſaliens, to invigorate the ſeminal plant: and thus we are at laſt conducted, by the regular analyſis of vegetable nature, to the firſt enlivening principle of their minuteſt origin.

So much for the generation of plants, and the diſcovery of their different ſexes, upon which Linnæus has founded his ſyſtem of botany, at preſent ſo much and ſo well received. Whoever, therefore, would conſider, more minutely, the ſtructure of flowers, and the almoſt infinite variety of the number and diſpoſition of their parts, may conſult Linnæus's Philoſophia Botanica, lately publiſhed, where this ſubject is treated in a very copious and inſtructive manner.

But beſides this regular and natural generation, many plants may be propagated, by planting cuttings or ſlips of them in the earth. See CUTTINGS.

GENERATION *of metals*, by earthquakes. See the article EARTHQUAKE.

GENERATION *of ſtones*. See the article LITHOGENESIA.

GENERICAL NAMES, among philoſophers, the ſame with general terms. See the article GENERAL TERMS, ſupra.

GENERICAL NAME, in natural hiſtory, the word uſed to ſignify all ſpecies of natural bodies, which agree in certain eſſential and peculiar characters, and therefore all of the ſame family or kind; ſo that the word uſed as the generical name, equally expreſſes every one of them, and ſome other words expreſſive of the peculiar qualities of figures of each are added, in order to denote them ſingly, and make up what is called the ſpecific name. Thus the word roſa, or roſe, is the generical name of the whole ſeries of flowers of that kind, which are diſtinguiſhed by the ſpecific names of the red roſe, the white roſe, the apple roſe, &c. The ignorance of former ages in the true principles of natural hiſtory, has occaſioned the bodies, which are the objects of it, to be arranged into very unnatural ſeries under the name of genera; and theſe have been called by names as improper, as the characters they were diſtinguiſhed by. Linnæus has done a great deal in the exploding the bad generical names in botany, and Artedi has applied his rules about the formation of theſe names with very little difference to the ſubjects of ichthyology. See the articles BOTANY and ICHTHYOLOGY.

GENEROSA, among lawyers, the addition

dition for a gentlewoman, who may quash any writ wherein she is termed spinster. See the article SPINSTER.

GENESIS, among mathematicians, signifies the formation or production of some figure or quantity. See GENERATING, supra.

GENESIS, among divines, a canonical book of the Old Testament, and the first of the pentateuch, or five books of Moses. The Hebrews call it Bereschith, or, In the beginning, these being the first words in the book. The Greeks gave it the name of Genesis, from its beginning with the history of the creation of the world. It includes the history of two thousand three hundred and sixty-nine years, and besides the history of the creation, contains an account of the original innocence and fall of man; the propagation of mankind; the rise of religion; the general defection and corruption of the world; the deluge; the restoration of the world; the division and peopling of the earth; and the history of the first patriarchs down to Joseph, at whose death it ends.

It was easy for Moses to be satisfied of the truth of what he delivers in this book, because it came down to his time through a very few hands. For, from Adam to Noah, there was one man (Methuselah) who lived to see them both: in like manner, from Noah to Abraham, Shem conversed with them both; as Isaac also did with Abraham and Joseph, from whom these things might easily be conveyed to Moses by Amram, who was cotemporary with Joseph. Moses is supposed to have written this book, during his retirement in the land of Midian, before he conducted the Israelites out of Egypt.

GENET, GENNET, or JENNET, in the manege, denotes a small sized, well proportioned spanish horse.

To ride *a la genette*, is to ride after the spanish fashion, so short, that the spurs bear upon the horse's flank.

GENET is also the name of a kind of cat, bred in Spain, somewhat bigger than a weasel, of a grey or black colour, but the fur of the black is the most valuable.

GENETHLIACI, in astrology, men who erect horoscopes, or pretend to predict what will happen to persons, from the stars which presided at their birth. See the article HOROSCOPE.

Nothing can be more absurd than this pretended science, and yet there have been times when princes themselves were greatly infatuated with these sort of people. The assurance with which these cunning fellows predicted future events made them always find dupes, and even after they were expelled from Rome by a decree of the senate, they met with such protection from the credulity of the people, that they still continued unmolested in the city.

GENETHLIACUM, or GENETHLIAC POEM, verses made on the birth of some prince, or other illustrious person, in which the poet, by a kind of prediction, promises him great advantages, great prosperity, and glorious victories.

The same name is also given to verses of this kind, made on the birth of any person whatsoever.

GENEVA, a city near the confines of France and Switzerland, on the river Rhone, about sixty miles north-west of Lyons: east long. 6°, north lat. 46° 20′.

Geneva is a fortified town, about two miles in circumference, situated at the west end of a lake sixty miles long, and twelve broad, called the lake of Geneva. It is a republic, governed by a council of 200, and a senate of twenty-five members; and is said to contain 30,000 inhabitants.

GENEVA, or GIN, among distillers, an ordinary malt-spirit, distilled a second time, with the addition of some juniper-berries. See the article JUNIPER.

Originally, the berries were added to the malt in the grinding; so that the spirit thus obtained was flavoured with the berries from first, and exceeded all that could be made by any other method. At present, they leave out the berries entirely, and give their spirits a flavour by distilling them with a proper quantity of oil of turpentine; which, though it nearly resembles the flavour of juniper-berries, has none of their valuable virtues.

GENEVIEVE, or *St*. GENEVIEVE's DAY, a festival observed at Paris on the third of January, in honour of St. Genevieve, patroness of the city.

GENIAL, an epithet given by the pagans to certain gods who were supposed to preside over generation.

The genial gods, says Festus, were earth, air, fire and water. The twelve signs, together with the sun and moon, were sometimes also ranked in the number.

GENICULI, among botanists, the knots or joints in the stalks of plants; whence they are denominated geniculate plants.

GENIOGLOSSI, in anatomy, two muscles which lie immediately under the genio-hyoidæus,

hyoidæus. They arife flefhy from the fore-part of the lower jaw internally, and inlarging themfelves, are inferted in the root of the tongue. When thefe act, they pull the tongue forwards, and thruft it out of the mouth.

GENIOHYOIDÆUS, in anatomy, is a mufcle which arifes in the middle of the chin, above the mylohyoides, and near the fynchondrofis of the jaw: its termination is in the bafe of the os hyoides.

GENIPA, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which confifts of a fingle, rotated petal; its tube is very fhort, and of a funnel-like fhape; and the limb large, and divided into five deep fegments. The fruit is a flefhy berry, of an oval figure, fmall at each end, truncated, and containing two cells, in which are a number of depreffed angulated feeds. See Plate CX. fig. 4.

GENIS, a town of Savoy, fituated on the river Guier, twelve miles weft of Chambery.

GENISTA, Green-weed, or Dyer's-weed, a genus of the diadelphia-decandria clafs of plants, with papilionaceous flowers; and the fruit a roundifh turgid, and unilocular pod, containing a fingle kidney-like feed.

GENITAL, an appellation given to whatever belongs to the parts of generation. See the article Generation.

Genital gods, *dii genitales*, in roman antiquity, the fame with the indigetes. See the article Indigetes.

GENITALIA, or Genitaries, in anatomy, a name fometimes given to the teftes, or tefticles of man, on account of their office in generation. See the article Testicle.

GENITES, γενητεις, among the Hebrews, thofe defcended from Abraham, without any mixture of foreign blood.

The Greeks diftinguifhed by the name of genites fuch of the Jews as were iffued from parents, who, during the babylonifh captivity, had not allied with any gentile family.

GENITIVE, in grammar, the fecond cafe of the declenfion of nouns. The relation of one thing confidered as belonging in fome manner to another, has occafioned a peculiar termination of nouns, called the genitive cafe: But in the vulgar tongues, they make ufe of a fign to exprefs the relation of this cafe. In englifh they prefix the particle *of*, in french *de*, or *du*, &c. Though in ftrictnefs there are no cafes in either of thefe languages; inafmuch as they do not exprefs the different relations of things by different terminations, but by additional prepofitions, which is otherwife in the latin, *&c.* See the article Case.

In the hebrew tongue, the genitive cafe is marked in a very different manner from that of the greek and latin; for whereas in thofe languages the noun governed is varied, in the hebrew the noun governing undergoes the alteration. See the article Hebrew language.

GENIUS, a good or evil fpirit, or dæmon, whom the antients fuppofed fet over each perfon, to direct his birth, accompany him in life, and be his guard. See the article Dæmon.

The rank and office of the genii were inferior to thofe of the lares; for the latter were the tutelar gods of a family, whereas the genii had the care or government only of fingle perfons, or places. Apuleius following the fentiment of Plato, gives the following account of the genii.

They are fpirits who never were ingaged in matter, nor were ever joined to bodies. Of thefe genii Plato is of opinion that every man has his own, who watches over him, and is a witnefs not only of his actions, but of his very thoughts; and that, when the perfon dies, the genius conducts the foul of which he had the charge, to judgment, and affifts at the trial: if the accufed perfon falfifies, the genius convicts him; if he fpeaks the truth, he confirms it; and it is upon his evidence that fentence is pronounced.

The antients not only afcribed a genius to particular perfons, but to places likewife. They allowed a genius to provinces and towns, to forefts, trees, fountains, and to the fciences. Each perfon facrificed once a year to his genius, and fcattered flowers, and fprinkled wine to him: fometimes they offered leaven or falted dough, or a pig two months old. It was commonly thought that each perfon had two genii attending him. Flattery introduced the cuftom of fwearing by the genius of the emperors, among the Romans, in the decline of that empire. Socrates's genius is famous in antiquity. The Mahometans pretend that the genii inhabited the world many thoufand years before Adam, under the reigns of feveral princes, who all bore the name of Solomon; but falling at length into a general corruption, Ebbi was fent to drive them

them to a remote part of the earth, there to be confined; that some of that generation, still remaining, they were by Talmurath, one of the antient kings of Persia, who waged war against them, forced to retreat to the famous mountains of Kaf. See the article ANGEL.

GENIUS, in matters of literature, &c. a natural talent or disposition to do one thing more than another; or the aptitude a man has received from nature to perform well and easily that which others can do but indifferently, and with a great deal of pains.

To know the bent of nature is the most important concern. Men come into the world with a genius determined not only to a certain art, but to certain parts of that art, in which only they are capable of success. If they quit their sphere, they fall even below mediocrity in their profession. Art and industry add much to natural indowments, but cannot supply them where they are wanting. Every thing depends on genius. A painter often pleases without observing rules, whilst another displeases though he observes them; because he has not the happiness of being born with a genius for painting.

A man born with a genius for commanding an army, and capable of becoming a great general by the help of experience, is one whose organical conformation is such, that his valour is no obstruction to his presence of mind, and his presence of mind makes no abatement of his valour. Such a disposition of mind cannot be acquired by art: it can be possessed only by a person who has brought it with him into the world. What has been said of these two arts, may be equally applied to all other professions. The administration of great concerns, the art of putting people to those employments for which they are naturally formed, the study of physic, and even gaming itself, all require a genius. Nature has thought fit to make a distribution of her talents among men, in order to render them necessary to one another; the wants of men being the very first link of society: she has therefore pitched upon particular persons to give them an aptitude to perform rightly some things which she has rendered impossible to others; and the latter have a greater facility granted them for other things, which facility has been refused to the former. Nature, indeed, has made an unequal distribution of her blessings among her children; yet she has disinherited none; and a man divested of all kinds of abilities, is as great a phænomenon as an universal genius.

From the diversity of genius, the difference of inclination arises in men, whom nature has had the precaution of leading to the employments for which she designs them, with more or less impetuosity in proportion to the greater or lesser number of obstacles they have to surmount, in order to render themselves capable of answering this vocation. Thus the inclinations of men are so very different, because they follow the same mover, that is, the impulse of their genius. This, as with the painter, is what renders one poet pleasing, even when he trespasses against rules; while others are disagreeable, notwithstanding their strict regularity.

The genius of these arts, according to the abbé du Bos, consists in a happy arrangement of the organs of the brain; in a just conformation of each of these organs; as also in the quality of the blood, which disposes it to ferment, during exercise, so as to furnish a plenty of spirits to the springs employed in the functions of the imagination. Here he supposes that the composer's blood is heated; for that painters and poets cannot invent in cool blood; nay, that it is evident they must be wrapt in a kind of enthusiasm when they produce their ideas. Aristotle mentions a poet who never wrote so well as when his poetic fury hurried him into a kind of frenzy. The admirable pictures we have in Tasso of Armida and Clorinda, were drawn at the expence of a disposition he had to real madness, into which he fell before he died. Do you imagine, says Cicero, that Pacuvius wrote in cold blood? No, it was impossible. He must have been inspired with a kind of fury, to be able to write such admirable verses.

GENNET, or GENET. See GENET.

GENOA, a city and archbishop's see of Italy, and capital of the republic of the same name, is built on a strand near the sea, and rises gradually to the top of a hill; the houses, which are lofty and well built, rising like the seats of a theatre, afford a fine prospect from sea. The harbour is large and deep, and the principal street, from one end to the other, resembles

resembles a double row of palaces: east long. 9° 30′, and north lat. 44° 30′.

This city, which is fortified by a double wall, is six miles round, and contains thirty parish churches, twenty colleges, and as many convents and religious houses. The legislative authority is lodged in the great senate, consisting of the signiory and four hundred noblemen and principal citizens, elected annually out of the freemen. The signiory consists of the doge and twelve other members, who hold their places two years. Four parts in five of the senate must agree to the enacting of laws. The doge is obliged to reside in the palace the two years he is in office; and after they are expired, he retires to his own house, where his administration is either approved or condemned; and if the latter, he is proceeded against as a criminal.

The territories of the republic lie in the form of a crescent, along the coast of the Mediterranean, extending 150 miles; but the country no where reaches above twenty miles from the sea, and in some places not ten.

GENS D'ARMES. See GENDARMES.

GENTIAN, *gentiana*, in botany, a genus of the pentandria-digynia class of plants, the flower of which consists of a single petal, tubulated and imperforated at the base; and at the edge, divided into five segments, various in figure: the fruit is an oblong, cylindric, acuminated capsule, slightly bifid at the top, formed of two valves, and containing only one cell: the seeds are numerous and small; the receptacles are two, and grow to the two valves of the capsule.

The root of this plant is large, remarkably tough, and of a firm texture. It is brought to us from Germany, where it is in many places cultivated as liquorice is amongst us; and is to be chosen fresh, tough, of a middle size, free from the small fibres, and well dried; tho' if it be scorched, it is to be rejected.

This root is one of the best stomachic bitters that the materia medica affords: it procures an appetite, and greatly assists digestion. But if we give credit to some authors, this is one of the least of its virtues; they have recommended it as a febrifuge and an alexipharmic, and as the most certain remedy for the bite of a mad dog. On this occasion it is not only recommended internally but externally, a cataplasm made of venice-treacle and the powder of this root, being ordered to be applied to the wound. It is also said to be a certain remedy for agues, and one of the best known medicines against the plague.

GENTILE, in matters of religion, a pagan, or worshipper of false gods.

The origin of this word is deduced from the Jews, who called all those who were not of their nation, by the name of גוים, gojim, *i. e.* gentes, which in the greek translations of the Old Testament, is rendered by τα εθνη; in which sense it frequently occurs in the New Testament, as in Matth. vi. 32: *All these things the nations or gentiles seek.* Whence the latin church also used gentes, in the same sense as our gentiles, especially in the New Testament. But the word gentes soon got another signification, and no longer meant all such as were not Jews, but those only who were neither Jews nor Christians, but followed the superstitions of the Egyptians, Greeks, Romans, &c. In this sense it continued among the christian writers, till their manner of speech, together with their religion, was publicly and by authority received in the empire, when gentiles, from gentes, came into use: and then both words had two significations, *viz.* in treatises or laws concerning religion, they signified pagans, neither Jews nor Christians: and in civil affairs, they were used for all such as were not Romans.

GENTILE, *gentilis*, in the roman law and history, a name which sometimes expresses what the Romans otherwise called barbarians, whether they were allies of Rome or not: but this word was used in a more particular sense for all strangers and foreigners not subject to the roman empire, in contradistinction to *provincialis*, or an inhabitant of a province of the empire.

The word is used in this sense in the Greek, but was not introduced into this or the latin tongue, till after christianity was established; it being taken from scripture.

GENTLEMAN, a person of a noble birth, or descended of a family which has long borne arms.

Chamberlayne observes, that in strictness, a gentleman is one whose ancestors have been freemen, and have owed obedience to none but their prince; on which footing no man can be a gentleman but one who is born such. But, among us, the term gentleman is applicable to all above yeomen; so that noblemen may be properly

perly called gentlemen. In our ſtatutes, *gentilis homo* was adjudged a good addition for a gentleman, 27 Edw. III. The addition of knight is very antient, but that of eſquire or gentleman was rare before 1 Hen. V.

GENTLEMAN *uſher of the black rod*. See the article ROD.

GENTLEMEN *of the chapel*, officers whoſe duty and attendance is in the royal chapel, being in number thirty-two, whereof twelve are prieſts; the other twenty, commonly called clerks of the chapel, aſſiſt in the performance of divine ſervice. One of the firſt twelve is choſen for confeſſor of the houſhold, whoſe office it is to read prayers every morning to the houſhold ſervants, to viſit the ſick, examine and prepare communicants, and adminiſter the ſacrament.

One of the twenty clerks, well verſed in muſic, is choſen firſt organiſt, who is maſter of the children, to inſtruct them in muſic, and whatever elſe is neceſſary for the ſervice of the chapel; a ſecond is likewiſe an organiſt; a third, a lutaniſt; and a fourth, a violiſt.

There are likewiſe three vergers, ſo called from the ſilver-rods they carry in their hands; being a ſerjeant, a yeoman, and groom of the veſtry; the firſt attends the dean and ſub-dean, and finds ſurplices and other neceſſaries for the chapel; the ſecond has the whole care of the chapel, keeps the pews, and ſeats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

GENTLEMEN PENSIONERS. See the article PENSIONER.

GENUFLEXION, among eccleſiaſtical writers, the poſture of kneeling, a very antient cuſtom in acts of devotion; though the Ruſſians are ſaid to eſteem it indecent, and even the diſſenters, among us, prefer that of ſtanding.

GENUS, among metaphyſicians and logicians, denotes a number of beings, which agree in certain general properties, common to them all; ſo that a genus is nothing elſe but an abſtract idea, expreſſed by ſome general name or term. See the articles ABSTRACTION and GENERAL TERMS.

It is plain, therefore, that by a genus we do not barely ſignify one particular thing, nor yet a plurality of things; but a ſort or kind of things, all agreeing in certain general properties.

Thus animal is ſaid to be a genus in reſpect of man and brute, in regard man and brute agree in the common nature and character of animal: ſo a right lined figure of four ſides, is a genus in reſpect of a parallelogram, and a trapezium; and ſo likewiſe is ſubſtance, in reſpect of ſubſtance extended, which is body; and thinking ſubſtance, which is mind.

The method by which the mind advances to form genera is, according to Mr Locke, as follows. Obſerving ſeveral things that differ from the mind's idea of man, for inſtance, and therefore cannot be comprehended under that name, to agree with man in ſome certain qualities by retaining only thoſe qualities, and uniting them into one idea, it gets another more general idea, to which giving a name, it makes a new genus, or a term of a more comprehenſive extenſion. Thus by leaving out the ſhape, and other properties ſignified by the word man, and retaining only a body with life, ſenſe, and ſpontaneous motion, we form the idea ſignified by the name animal. By the ſame way the mind proceeds to body, ſubſtance; and at laſt to being, thing, and ſuch univerſal terms as ſtand for any ideas whatever.

This ſhews the reaſon why, in defining things, we make uſe of the genus, namely, to ſave the labour of enumerating the ſeveral ſimple ideas which the next term ſtands for: from whence it appears, that genus is no more than an abſtract idea comprehending a greater or leſs number of ſpecies, or more particular claſſes. See the article SPECIES.

Genus and ſpecies themſelves are the workmanſhip of human underſtanding; though it is not denied that nature, in making things alike, lays the foundation of this ſorting and claſſing, ſo that every diſtinct, abſtract idea, is a diſtinct eſſence: whence in the ſchools, the word eſſence has been almoſt wholly applied to the artificial conſtitution of genus and ſpecies. See the article ESSENCE.

In the ſeries of notions riſing one above another in the degree of univerſality, that diviſion which comprehends under it ſeveral genera, is called in the ſchools the higher genus, which denomination continues until we arrive at the laſt advance of the underſtanding; when being come to the moſt general of all ideas that admit not of a ſuperior, it is diſtinguiſhed by the name of the genus generaliſſimum. In like manner, the ſeveral genera comprehended under a higher genus,

nus, are in respect of it considered as species; and as these last too have species under them, the inferior divisions are, for distinction's sake, termed lower species. Thus the progression continues, and when we come to the lowest sub-division of all, comprehending only individuals, we call this the species specialissima. All that lie between this and the highest distribution of things are the intermediate genera and species, which are termed each in their turn genus generalius, or species specialior, according as we consider them in the ascending or descending scale of our ideas; or, to speak in the language of logicians, according to their ascent or descent in linea prædicamentali.

GENUS is also used for a character or manner applicable to every thing of a certain nature or condition: in which sense it serves to make capital divisions in divers sciences, as music, rhetoric, anatomy, and natural history.

GENUS, in music, by the antients called *genus melodiæ*, is a certain manner of dividing and sub-dividing the principles of melody; that is, the consonant and dissonant intervals, into their concinnous parts.

The moderns considering the octave as the most perfect of intervals, and that whereon all the concords depend, in the present theory of music, the division of that interval is considered as containing the true division of the whole scale. See the articles SCALE and OCTAVE.

But the antients went to work somewhat differently: the diatessaron, or fourth, was the least interval which they admitted as concord; and therefore they sought first how that might be most conveniently divided: from whence they constituted the diapente and diapason.

The diatessaron being thus, as it were, the root and foundation of the scale, what they call the genera, or kinds, arose from its various divisions; and hence they defined the genus *modulandi* the manner of dividing the tetrachord, and disposing its four sounds as to succession.

The genera of music were three, the enharmonic, chromatic, and diatonic: the two first were variously subdivided, and even the last, though that is commonly reckoned to be without any species; yet different authors have proposed different divisions under that name, without giving any particular names to the species, as was done to the other two.

For the characters, &c. of these several genera, see the articles ENHARMONIC, CHROMATIC, and DIATONIC.

GENUS, in rhetoric. Authors distinguish the art of rhetoric, as also orations or discourses produced thereby, into three genera or kinds, demonstrative, deliberative, and judiciary.

To the demonstrative kind belong panegyrics, genethliacons, epithalamiums, funeral harangues, &c. See the articles PANEGYRIC, &c.

To the deliberative kind belong persuasions, dissuasions, commendations, &c.

To the judiciary kind belong defences and accusations. See the articles RHETORIC, ORATION, &c.

GENUS, in algebra. The antient algebraists divided that art into two genera or kinds, *viz.* the logistic and specious. See LOGISTIC and SPECIOUS.

GENUS, in anatomy, the genus nervosum, or nervous kind; or, as others term it, the nervous system, is an expression pretty frequent among anatomists, signifying the nerves considered as an assemblage or system of similar parts, distributed throughout the body. See NERVES.

GENUS, in natural history, a sub-division of any class or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters.

The genera of animals ought to be established upon the most natural obvious, and distinctive characters. Thus it would be absurd to range the ox and hog under the same genus, notwithstanding they have both divided hoofs; and it would be equally so to make the roe-deer, rain-deer, and elk, belong to different genera, merely because the figure of their horns differs considerably. Hence the characters of the genera of animals are to be taken from the figure, situation, number, and proportions of their parts; which constitute such a resemblance, as easily distinguish them from the species of any other genus.

In the class of quadrupeds, besides a general resemblance, the different genera are distinguished from each other by the number and figure of their teeth, the shape of their feet, horns, and the like. See the article QUADRUPEDS.

In the class of birds, the generical characters are drawn from the shape of their beak,

beak, and the number and disposition of their toes. See the article BIRD.

In the class of amphibious animals, the generical characters are founded on the number of the crusts or scales on the bellies and tails of the serpent-kind, and on the figure of the tail, and the number and shape of toes in the lizard, frog, and tortoise-kinds. See the articles SERPENT, LIZARD, *&c.*

As to the genera of fishes, they are founded on a certain agreement between a number of species, arising from the similitude of their essential external parts; which always consist in the situation of these parts, for the most part also in their number, and frequently in their figure and proportion.

The insect-class are distinguished into genera, from the number, figure, *&c.* of their antennæ, feet, snout, *&c.*

And the animalcules, as mentioned under the article ANIMALCULE.

With respect to the vegetable kingdom, all plants and trees are reduced to genera from the consideration of the number, situation, figure, and proportion of the parts of fructification. See the article FRUCTIFICATION.

In the same manner, the genera of fossils are established upon the figure, hardness, consistence, inflammability, and other obvious properties of the substances that compose the mineral kingdom. See the article FOSSIL.

GEOCENTRIC, in astronomy, is applied to a planet or its orbit, to denote it concentric with the earth, or as having the earth for its center, or the same center with the earth. See the articles EARTH and PLANET.

GEOCENTRIC *latitude of a planet*, is its distance from the ecliptic as it is seen from the earth, which, even though the planet be in the same point of her orbit, is not constantly the same, but alters according to the position of the earth in respect to the planet. For let B A T *t* (plate CXIII. fig. 2.) be the orbit of the earth, P N *n* the orbit of the planet, which suppose to be at P; from which let fall on the plane of the ecliptic the perpendicular P E. In whatever part of her orbit the earth is, this line P E will always subtend the angle which measures the geocentric latitude of the planet. Suppose, therefore, the earth at T, and venus in P, where she comes nearest to the earth, in which position venus is seen in her inferior conjunction with the sun, and her geocentric latitude is measured by the angle P T E. But if venus should be in the same situation, P, and the earth were at *t*, and from thence venus were observed in her superior conjunction with the sun, where she is at her greatest distance from us, her geocentric latitude would be answerable to P *t* E, which is much less than the angle P T E, because the distance P *t* is greater than P T.

What we have here said of the latitude of venus, is likewise true of that of mercury, and upon the same account. See HELIOCENTRIC and LATITUDE.

GEOCENTRIC *place of a planet*, the place wherein it appears to us from the earth, supposing the eye there fixed: or it is a point in the ecliptic to which a planet seen from the earth is referred.

GEODÆSIA, the same with surveying. See the article SURVEYING.

GEODES, in natural history, a genus of siderochita, consisting of crustated bodies, inclosing a small quantity of earthy or arenaceous matter. See SIDEROCHITA.

Of this genus are the following known species. 1. The cracked geodes, with ferrugineous, brown, and yellow crusts. 2. The wrinkled geodes, with ferrugineous, reddish, brown, and gold-yellow crusts. 3. The sparkling geodes, with ferrugineous, purpulish, and orange-coloured crusts. 4. The long, scabrous geodes, with a single purpulish crust. And 5. The long geodes, with a single blackish crust.

GEOGRAPHICAL MILE, the same with the sea-mile; being one minute, or the sixtieth part of a degree of a great circle on the earth's surface.

GEOGRAPHY, the doctrine or knowledge of the terrestrial globe; or the science that teaches and explains the properties of the earth, and the parts thereof which depend upon quantity.

Geography, as defined by Varenius, is that part of mixt mathematics, which explains the state of the earth, and of its parts depending on quantity, *viz.* its figure, place, magnitude, and motion, with the celestial appearances, *&c.* In consequence of this definition, that author divides geography into general and special, or universal and particular.

By universal geography, is understood that part of the science which considers the whole earth in general, and explains its properties without regard to particular countries. This division is distinguished into three parts, absolute, relative, and com-

comparative. The abſolute part reſpects the body of the earth itſelf, its parts and peculiar properties, as its figure, magnitude, and motion; its lands, ſeas, and rivers, *&c.* The relative part accounts for the appearances and accidents that happen to it from celeſtial cauſes; and, laſtly, the comparative contains an explanation of thoſe properties which ariſe from comparing different parts of the earth together.

Special or particular geography, is that diviſion of the ſcience which deſcribes the conſtitution and ſituation of each ſingle country by itſelf; and is twofold, *viz.* chorographical, which deſcribes countries of a conſiderable extent; or topographical, which gives a view of ſome place, or ſmall tract of the earth. See the articles CHOROGRAPHY and TOPOGRAPHY.

Hence the object or ſubject of geography is the earth, eſpecially its ſuperficies and exterior parts.

The properties of geography, according to the ſame writer, are of three kinds, *viz.* celeſtial, terreſtrial, and human. The celeſtial properties are ſuch as affect us by reaſon of the apparent motion of the ſun and ſtars. Theſe are eight in number. 1. The elevation of the pole, or the diſtance of a place from the equator. 2. The obliquity of the diurnal motion of the ſtars above the horizon of the place. 3. The time of the longeſt and ſhorteſt day. 4. The climate and zone. 5. Heat, cold, and the ſeaſons of the year; with rain, ſnow, wind, and other meteors. 6. The riſing, appearance and continuance of the ſtars above the horizon. 7. The ſtars that paſs through the zenith of a place. 8. The celerity of the motion with which, according to the copernican hypotheſis, every place conſtantly revolves. See the articles ELEVATION, POLE, *&c.*

The terreſtrial properties are thoſe obſerved in the face of each country, and are ten in number. 1. The limits and bounds of each country. 2. Its figure. 3. Its magnitude. 4. Its mountains. 5. Its waters, *viz.* ſprings, rivers, lakes, and bays. 6. Its woods and deſarts. 7. The fruitfulneſs and barrenneſs of the country, with it various kinds of fruits. 8. The minerals and foſſils. 9. The living creatures there. 10. The longitude and latitude of the place.

The third kind of obſervations to be made in every country is called human, becauſe they chiefly regard the inhabitants of the place, and theſe are alſo ten in number. 1. Their ſtature, ſhape, colour, and the length of their lives; their origin, meat, and drink. 2. Their arts, and the profits which ariſe from them, with the merchandize and wares they barter one with another. 3. Their virtues and vices, learning, capacities, and ſchools. 4. Their ceremonies at births, marriages, and funerals. 5. The language which the inhabitants uſe. 6. Their political government. 7. Their religion and church government. 8. Their cities and famous places. 9. Their remarkable hiſtories. 10. Their famous men, artificers, and inventions of the natives. Theſe are the three kinds of occurrences to be explained in ſpecial geography.

In univerſal geography, the abſolute diviſion of the earth, and the conſtitution of its parts, are examined; and the celeſtial phænomena in general are to be applied to their reſpective countries in ſpecial geography.

The principles of geography, or thoſe from which arguments are drawn for proving of propoſitions in that ſcience, are, according to Varenius, of three ſorts. 1. Geometrical, arithmetical, and trigonometrical propoſitions. 2. Aſtronomical precepts and theorems. 3. Experience, being that upon which the greateſt part of geography, and chiefly the ſpecial, is founded.

In proving geographical propoſitions, we are to obſerve that ſeveral properties, and chiefly the celeſtial, are confirmed by proper demonſtrations; but in ſpecial geography, excepting the celeſtial, almoſt every thing is explained without demonſtration; being either grounded on experience and obſervation, or on the teſtimony of our ſenſes: nor can they be proved by any other means. There are alſo ſeveral propoſitions proved, or rather expoſed to view, by the terreſtrial globe, or by geographical maps. See the articles GLOBE and MAP.

Other propoſitions cannot be ſo well proved, yet are received as apparent truths. Thus, tho' we ſuppoſe all places on the globe, and in maps, to be laid down in the ſame order as they are really on the earth; nevertheleſs, in theſe matters, we rather follow the deſcriptions that are given by geographical writers.

The manner in which we have treated the ſeveral geographical articles that occur throughout this work, may be ſeen under

under each head, and our division of the science may be seen in the introduction.

Geography is very antient, at least the special part thereof; for the antients scarce went beyond the description of countries. It was a constant custom among the Romans, after they had conquered and subdued any province, to have a map or printed representation thereof, carried in triumph, and exposed to the view of the spectators. Historians relate, that the roman senate, about an hundred years before Christ sent geographers into divers parts to make an accurate survey and mensuration of the whole globe, but they scarce ever saw the twentieth part of it.

Before them, Neco, king of Egypt, ordered the Phoenicians to make a survey of the whole coast of Africa, which they accomplished in three years. Darius procured the Ethiopic sea, and the mouth of the Indus, to be surveyed; and Pliny relates, that Alexander, in his expedition into Asia, took two geographers to measure and describe the roads; and that from their itineraries, the writers of the following ages took many particulars. Indeed this may be observed, that whereas most other arts and sciences are sufferers by war, geography and fortification alone have been improved thereby. Geography, however, must have been exceedingly defective, as a great part of the globe was then unknown, particularly all America, the northern parts of Europe and Asia, with the Terra Australis, and Magellanica; and as they were ignorant of the earth's being capable to be sailed round, and of the torrid zone's being habitable, *&c.*

The honour of reducing geography to art and system, was reserved for Ptolemy, who, by adding mathematical advantages to the historical method in which it had been treated of before, has described the world in a much more intelligible manner: he has delineated it under more certain rules, and by fixing the bounds of places from longitude and latitude, hath discovered others mistakes, and has left us a method of discovering his own.

There is one thing yet very lame in our geography, the fixing the true longitude of places; and though several new ways have been lately tried to redress this inconvenience, both from exact pendulums, and from other observations, upon the immersions and emersions of Jupiter's satellites, yet they have not altogether proved effectual. See the article LONGITUDE.

The principal writers upon geography, among the antients, are Ptolemy, Pliny, and Strabo: among the moderns, Joannes de Sacrobosco, Cluverius, Heylen, Ricciolus, Weigelius, de Chales, and, above all, Varenius, with Jurin's additions; to which may be added Leibnecht, Sturmius, Morden, Gordon, Salmon, *&c.*

GEOMANCY, γεωμαντεια, according to Polydore Virgil, a species of divination performed by means of chinks made in the ground. Though others think it consisted in making a number of little dots on paper, at random; and from the various figures which those make, forming a judgment of futurity.

GEOMETRICAL, in general, an appellation given to whatever belongs to, or is strictly connected with geometry. See the article GEOMETRY.

GEOMETRICAL *construction of equations*. See the article CONSTRUCTION.

GEOMETRICAL CURVE. See CURVE.

GEOMETRICAL LOCUS, or PLACE. See the article LOCUS.

GEOMETRICAL PACE. See PACE.

GEOMETRICAL PLANE, in perspective. See the article PLANE.

GEOMETRICAL PROGRESSION and PROPORTION. See PROGRESSION and PROPORTION.

GEOMETRICAL *solution of a problem*, is when it is solved according to the rules of geometry, and by such lines as are truly geometrical, and agreeable to the nature of the problem. See PROBLEM.

GEOMETRY, γεωμετρια, originally signified no more than the art of measuring the earth, or any distances or dimensions within it; but at present, it denotes the science of magnitude in general; comprehending the doctrine and relations of whatever is susceptible of augmentation or diminution, considered in that light.

Hence, to geometry may be referred the consideration not only of lines, surfaces, and solids; but also of time, velocity, number, weight, *&c.*

Plato thought the word geometry an improper name for this science, and accordingly substituted in its place the more extensive one of mensuration; and, after him, others gave it the title of pantometry, as demonstrating not only the quantities of all manner of magnitudes, but also their qualities, ratios, positions, trans-

transformations, relations, &c. And Proclus calls it the knowledge of magnitude and figures, and their limitations; alſo of their motions, and affections of every kind.

Origin and progreſs of GEOMETRY. This ſcience had its riſe among the Egyptians, who were in a manner compelled to invent it to remedy the confuſion which generally happened in their lands, from the inundations of the river Nile, which carried away all boundaries, and effaced all the limits of their poſſeſſions. Thus this invention, which at firſt conſiſted only in meaſuring the lands, that every perſon might have what belonged to him, was called geometry, or the art of meaſuring land; and it is probable, that the draughts and ſchemes, which they were annually compelled to make, helped them to diſcover many excellent properties of theſe figures; which ſpeculations continued to be gradually improved, and are ſo to this day.

From Egypt geometry paſſed into Greece, where it continued to receive new improvements in the hands of Thales, Pythagoras, Archimedes, Euclid, &c. The elements of geometry, written by this laſt in fifteen books, are a moſt convincing proof to what perfection this ſcience was carried among the antients. However, it muſt be acknowledged, that it fell ſhort of modern geometry, the bounds of which, what by the invention of fluxions, and the diſcovery of the almoſt infinite orders of curves, are greatly enlarged. See the articles CURVE and FLUXION.

We may diſtinguiſh the progreſs of geometry into three ages: the firſt of which was in its meridian glory at the time when Euclid's Elements appeared; the ſecond, beginning with Archimedes, reaches to the time of Des Cartes, who, by applying algebra to the elements of geometry, gave a new turn to this ſcience, which has been carried to its utmoſt perfection by Sir Iſaac Newton and Mr. Leibnitz.

Diviſion of GEOMETRY. This ſcience is uſually diſtinguiſhed into elementary, and higher or ſublime geometry.

The firſt, or elementary geometry, treats of the properties of right lines, and of the circle, together with the figures and ſolids formed by them. The doctrine of lines come firſt, then that of ſurfaces, and laſtly that of ſolids.

The higher geometry comprehends the doctrine of the conic ſections, and numerous orders of curves. See the article CONIC SECTIONS and CURVE.

Geometry is again divided into ſpeculative and practical; the former treating of the properties of lines and figures, as Euclid's Elements, Appolonius's Conic Sections, &c. and the latter ſhewing how to apply theſe ſpeculations to the uſe of menſuration, navigation, ſurveying, taking heights and diſtances, gauging, gunnery, &c. See the article MENSURATION, NAVIGATION, &c.

We have an excellent treatiſe on this ſubject by Dr. Gregory, with additions by Mr. Maclaurin: it is divided into three parts; the firſt of which teaches the menſuration of lines and angles. In the ſecond, ſurfaces are treated of; and theſe not only ſuch as are plain, but likewiſe curve-ſurfaces, as thoſe of a cylinder, cone, and ſphere. The third part treats of ſolid figures and their menſuration, as ſphere, cylinder, cone, &c. See the articles, SPHERE, CYLINDER, &c.

Uſefulneſs of GEOMETRY. The uſefulneſs of this ſcience extends to almoſt every art and ſcience. It is by the help of it that aſtronomers turn their obſervations to advantage, regulate the duration of times, ſeaſons, years, cycles, and epochas; and meaſure the diſtance, motions, and magnitudes of the heavenly bodies. It is by it that geographers determine the figure and magnitude of the whole earth; and delineate the extent and bearings of kingdoms, provinces, harbours, &c. It is from this ſcience too, that architects derive their juſt meaſures, in the conſtruction of public edifices as well as of private houſes. See the articles ASTRONOMY, GEOGRAPHY, and ARCHITECTURE.

It is by the aſſiſtance of geometry that engineers conduct all their works, take the ſituation and plans of towns, the diſtances of places, and the meaſure of ſuch things as are only acceſſible to the ſight. It is not only an introduction to fortification, but highly neceſſary to moſt mechanics, eſpecially carpenters, joiners, mathematical-inſtrument makers, and all who profeſs deſigning. See the articles CARPENTRY, JOINERY, SHIP, ENGRAVING, DESIGNING, &c.

On geometry likewiſe depends, the theory of muſic, optics, perſpective, drawing, mechanics, hydraulics, pneumatics, &c. See MUSIC, OPTICS, PERSPECTIVE, DRAWING, MECHANICS, &c.

GEOPONIC, ſomething relating to agriculture. See AGRICULTURE.

GEORGE, or *Knights of St.* GEORGE, has been the denomination of feveral military orders, whereof that of the garter is one of the moft illuftrious. See GARTER. There is alfo one of thefe orders ftill fubfifting at Genoa.

Religious of the order of St. GEORGE, form feveral congregations in Italy and other places.

St. GEORGE *del Mina,* the capital of the dutch fettlements, on the Gold-coafts of Guinea, fituated feven or eight miles weft of Cape-coaft-caftle, the capital of the britifh fettlements there: weft longitude 5′, and north latitude 5°.

Fort St. GEORGE, a town and fort on the coaft of Coromandel, in the hither India: eaft lon. 80°, and north lat. 13°. The town is divided into the White and Black-town. The fort, and White-town, which adjoins to it, are inhabited only by Britifh; the whole circumference, which is not above half a mile, being furrounded by a ftone wall. The outward or Black-town, called Madrafs, has been lately encompaffed by a ftone wall and baftions, and is about a mile and a half in circumference; the whole being almoft environed by a river and the fea.

St. GEORGE'S, the largeft of the Bermuda or Summer-iflands.

Crofs of St. GEORGE, a red one in a field argent, which makes part of the britifh ftandard. See CROSS and GARTER.

GEORGIA, in Afia, a province bounded by Circaffia and Degeftan on the north by the Cafpian fea on the eaft, by Armenia or Turcomania on the fouth, and by Mingrelia on the weft.

GEORGIA, in America, one of the britifh plantations, taken out of South-Carolina, from which it is feparated by the river Savannah on the north, and bounded by the Atlantic ocean on the eaft, by the river of St. John, which divides it from fpanifh Florida, on the fouth and weft.

GEORGIAN MONKS and NUNS, religious of Georgia, in Afia, who follow the rule of St. Bafil. See the article BASIL.

GEORGIC, a poetical compofition upon the fubject of hufbandry, containing rules therein, put into a pleafing drefs, and fet off with all the beauties and embellifhments of poetry.

The ftyle proper to a georgic muft be worked up with a great deal of thought and vigour, that the words may be lively, and every thing the poet defcribes may immediately rife up to the reader's view. Hefiod and Virgil are the two greateft mafters of this kind of poetry. In Virgil's Georgics are contained the moft ufeful rules for hufbandry in all its branches. Virgil has infinitely exceeded Hefiod in this fort of writing: he began his Georgics at the perfuafion of Mæcenas, and was near feven years about them: they are, with refpect to the diction, the moft finifhed of all his works, and even of all the poems that ever were compofed in latin. The moderns have produced nothing in this kind, except Rapin's book Of Gardening, and the celebrated poem entitled Cyder, by Mr. Philips, who, if he had enjoyed the advantage of Virgil's language, would have been fecond to Virgil in a much nearer degree.

GERANITES, in natural hiftory, an appellation given to fuch of the femipellucid gems, as are marked with a fpot refembling a crane's eye.

GERANIUM, CRANE'S BILL, in botany, a genus of the monadelphia-decandria clafs of plants, the flower of which confifts of five large, patent, oval, and vertically cordated petals; the fruit is a capfule, of the form of a crane's bill.

Geranium ftands recommended by authors, as one of the greateft vulneraries and aftringents of the vegetable world, particularly for ftopping hæmorrhages, excefs of the menfes, *&c.*

GERARDIA, in botany, a genus of the didynamia-angiofpermia clafs of plants, the corolla of which confifts of a fingle ringent petal; the tube is roundifh, and longer than the cup; the upper lip is erect, obtufe, plain, and emarginated; the lower lip is reflected, and divided into three fegments: the fruit is an oval capfule, containing two cells, and confifting of two valves; the feeds are oval and fingle.

This plant is much recommended in gouty diforders.

GERBERA, in botany, a genus of the fyngenefia-polygamia clafs of plants, the general corolla of which is radiated, with very numerous hermaphrodite corollulæ on the difc, which are monopetalous, erect, and divided into three fegments at the limb; the ftamina are five very fhort filaments; the feeds are fingle, oblong, crowned with flender down, and contained in the cup.

GERFALCON, or GYRFALCON, among fportfmen, a hawk of great force. See the article HAWK.

The gerfalcon is the largeft of the falcon-kind, with head and eyes like thofe of the

the haggard. She is strong armed, having long stretchers and singles; and being of a fierce and hardy nature, is extremely difficult to be reclaimed; but when once she is overcome, she proves an excellent hawk, and will scarce refuse to fly at any thing. See FALCONRY.

GERGENTUM, a town of Sicily, the Agrigentum of the antients, about fifty-five miles south-east of Palermo: east long. 13° 30′, and north lat. 37° 20′.

GERMAINS, or *St.* GERMAINS, a town and royal palace of France, fourteen miles north-west of Paris.

St. GERMAINS is also a borough of Cornwal, eight miles west of Plymouth. It sends two members to parliament.

GERM, among gardeners, the same with bud. See the article BUD.

GERMAN, in genealogy, denotes entire or whole: thus, a brother german is one both by the father's and mother's side; and cousins-german are the children of brothers or sisters.

GERMAN, or GERMANNIC, also denotes any thing belonging to Germany; as the german empire, german flute, *&c.*

GERMANDER, in botany, the english name of the teucrium of Linnæus. See the article TEUCRIUM.

Water GERMANDER, a plant called by botanists scordium. See SCORDIUM.

Wild-GERMANDER, a species of a genus of plants, called by botanists veronica. See the article VERONICA.

GERMANY, an extensive empire of Europe, situated between 5° and 19° east longitude, and between 45° and 55° north latitude; bounded by Denmark and the Baltic sea on the north, by Poland and Hungary on the east, by Switzerland and the Alps on the south, and by France, Holland, *&c.* on the west.

It is divided into ten circles, three of which lie on the north, *viz.* Upper and Lower Saxony, and Westphalia; three on the south, *viz.* Austria, Bavaria, and Swabia; three about the middle, *viz.* Franconia, and the Upper and Lower Rhine; the tenth, which consisted of the dutchy of Burgundy and the seventeen provinces of the Netherlands, have long been detached from the empire. See SAXONY, WESTPHALIA, *&c.*

There are in Germany upwards of three hundred sovereign princes and states, most of them arbitrary in their respective territories.

GERMEN, or GERM, the same with bud. See the article BUD.

GERMERSHEIM, a town of Germany, subject to France, about ten miles east of Landau: east long. 8° 15′, and north lat. 49° 12′.

GERMINATION, the first sprouting of the seeds of plants. See VEGETATION.

GERONTES, in grecian antiquity, a sort of magistrates of antient Sparta, answering to the areopagites at Athens.

GERTRUDENBURG, a fortified town of the united Netherlands, in the province of Holland, nine miles north of Breda; subject to the prince of Orange.

GERUND, in grammar, a verbal noun of the neuter-gender, partaking of the nature of a participle, declinable only in the singular number, through all the cases except the vocative; as, nom. *amandum*, gen. *amandi*, dat. *amando*, accus. *amandum*, abl. *amando*.

Grammarians are very much embarrassed to settle the proper nature and character of gerunds. It is certain they are no verbs, nor distinct moods of verbs, in regard they do not mark any judgment or affirmation of the mind, which is the essence of a verb; besides their having cases, which verbs have not. Some, therefore, will have them to be adjectives passive, whose substantive is the infinitive of the verb, and retaining the ordinary regimen thereof. See the article NOUN.

The gerunds are derived from active, neuter, and deponent verbs; and, for the most part, they follow their signification; as, *docendum*, from *doceo*; *currendo*, from *curro*; *loquendum*, from *loquor*.

GESNERIA, in botany, a genus of plants, of the didynamia class, the flower of which is monopetalous, tubular, and divided into five segments at the limb; the fruit is a roundish capsule, containing a very great number of extremely small seeds.

GESSERIT, or *Quam diu se bene* GESSERIT. See the article QUAM DIU.

GESSES, or JESSES, the furniture belonging to a hawk. See JESSES.

GESTATION, among physicians, the same with pregnancy. See PREGNANCY.

GESTICULATION, in rhetoric, signifies the affected action of an orator, which is deemed a great fault. See ACTION.

GESTRICIA, a province of Sweden, bounded by Helsingia on the north, by the Bothnic gulph on the east, by Upland on the south, and by Dalecarlia on the west.

GESTU ET FAMA, an antient writ, where a person's good behaviour was impeached, now out of use.

GESTURE,

GESTURE, in rhetoric, confifts chiefly in the proper action of the hands and face. It is a kind of natural language, that fupplies the ufe of fpeech in perfons born dumb. See the article ACTION.

GETHYLLIS, in botany, a genus of the decandria-monogynia clafs of plants, the corolla of which confifts of a fingle petal; the tube is filiform and very long; the limb is plane, divided into fix equal fegments, of a lanceolated figure, and but about a third part the length of the tube; the fruit is an oblong, ventricofe, triangular capfule, with three cells; the feeds are numerous.

GEVAUDAN, a territory of Languedoc, adjoining to the Cevennes.

GEUM, *avens*, in botany, a genus of the icofandria-pentagynia clafs of plants, the corolla of which confifts of five roundifh petals, with narrow ungues of the length of the cup, and inferted into it; there is no pericarpium; the common receptacle of the feeds is oblong, hairy, and placed on the cup, which is, at that time, reflex: the feeds are numerous, compreffed, hifpid, and each furnifhed with a long geniculated ftyle.

GHENT, or GAUNT, a city and capital of Flanders, thirty miles north-weft of Bruffels: eaft longitude 3° 36′, north latitude 51°.

It is a large fortified town, twelve miles in circumference, and defended by a citadel; and yet is a place of no great ftrength, by reafon of the vaft extent of ground it takes in.

GIAGH, in chronology, a cycle of twelve years; in ufe among the Turks and Cathayans. See the article CYCLE.

Each year of the giagh bears the name of fome animal: the firft, that of a moufe; the fecond, that of a bullock; the third, of a lynx or leopard; the fourth, of a horfe; the fifth, of a crocodile; the fixth, of a ferpent; the feventh, of a horfe; the eighth, of a fheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog.

They alfo divide the day into twelve parts, which they call giaghs, and diftinguifh them by the name of fome animals. Each giagh contains two of our hours, and is divided into eight kehs, as many as there are quarters in our hours.

GIALLOLINO, in natural hiftory, a heavy, friable, fine, yellow ochre, called naples-yellow, and much ufed among painters, who efteem it a very fine colour. See the article OCHRE.

GIANT, γιγας, a perfon of enormous bulk, or ftature.

The reality of giants, and of nations of giants, is much controverted among the learned. Dr. Derham obferves, that though we read of giants before Noah's flood, yet there is great reafon to think the fize of a man was always the fame from the creation: for as to the nephilim, or giants, in Gen. vi. the antients vary about them; fome take them for great atheifts, and monfters of impiety, rapine, tyranny, and all wickednefs, as well as of monftrous ftature. And as to thofe Numb. xiii. reprefented as men of gigantic fize, it is probable the fears of the fpies might have added thereto: however this be, it is plain that in both thefe places giants are fpoke of as rarities and wonders of the age, not of the common ftature; and fuch inftances we have had in all ages.

GIANT'S BONES, in natural hiftory, a name erroneoufly given to certain foffile bones, vulgarly fuppofed to have been the bones of giants; but, in reality, are thofe of the elephant or whale-kind.

GIANT'S CAUSEWAY, a vaft collection of a black kind of marle, called bafaltes, in the county of Antrim, in Ireland. See the article BASALTES.

GIAROLA, in ornithology, a fpecies of lark, with a remarkable long heel.

GIAROLO, a fpecies of fnipe, with a white tail. See the article SNIPE.

GIBBOUS, a term in medicine, denoting any protuberance or convexity of the body, as a perfon hunched, or humpbacked.

Gibbofity is a preternatural incurvation of the fpina dorfi either backward, or on one fide. Infants are more fubject to this diforder than adults, and it oftner proceeds from external, than from internal caufes. A fall, blow, or the like violence frequently thus diftorts the tender bones of infants. When it proceeds from an internal caufe, it is generally from a relaxation of the ligaments that fuftain the fpine, or a caries of its vertebræ; though the fpine may be reflected forward, and the back thrown out, by a too ftrong and repeated action of the abdominal mufcles; and this, if not timely redreffed, ufually grows up and fixes as the bones harden, till in adults it is totally irretrievable; but when the diforder is recent, and the perfon young, there are

there are ſome hopes of a cure. The common method is by a machine of paſtboard, wood, or ſteel, which is made to preſs principally upon the gibbous part, and this by long wearing may ſet all right. The ſurgeons however have a different inſtrument, which they call a croſs, much more efficacious, though not quite ſo convenient in the wearing; by the uſe of this, the parts are always prevented from growing any worſe, and are often cured. During the application of theſe aſſiſtances, Heiſter orders the parts to be at times rubbed with hungary water, ſpirit of lavender, and the like, and defended with a ſtrengthening plaſter of oxycroceum, opodeldoc, or the like.

GIBBOUS, in aſtronomy, a term uſed in reference to the enlightened parts of the moon, whilſt ſhe is moving from the firſt quarter to the full, and from the full to the laſt quarter: for all that time the dark part appears horned, or falcated; and the light one hunched out, convex, or gibbous. See the article MOON.

GIBELINS, or GIBELLINS, a famous faction in Italy, oppoſite to another, called the guelphs.

Theſe two factions ravaged and laid waſte Italy for a long ſeries of years, ſo that the hiſtory of that country, for the ſpace of two centuries, is no more than a detail of their mutual violences and ſlaughters.

The gibelins ſtood for the emperor againſt the pope: but concerning their origin and the reaſon of their names, we have but a very obſcure account. According to the generality of authors, they roſe about the year 1240, upon the emperor Frederic II's being excommunicated by pope Gregory IX. Other writers maintain, that the two factions aroſe ten years before, though ſtill under the ſame pope and emperor. But the moſt probable opinion is that of Maimburg, who ſays, that the two factions of guelphs and gibelins aroſe from a quarrel between two antient and illuſtrious houſes on the confines of Germany, that of the Henrys of Gibeling, and that of the guelphs of Adorf.

GIBET, a kind of gallows, whereon criminals are executed, or hung in chains. See the article GALLOWS.

GIBLETS, *gigeriæ*, the offals of poultry, particularly of a gooſe and duck, including the head and neck, heart, liver, pinions, and legs; which the art of cookery has buſied itſelf about, by inventing ragouts, pies, ſoops, &c. made of them.

GIBRALTAR, a port-town of Andaluſia, in Spain, ſubject to Great Britain: weſt long. 6°, and north lat. 36°.

It ſtands at the foot of mount Calpe, one of Hercules's Pillars, about ſixteen miles north of Ceuta, in Africa, from which it is divided by the Streights, to which it gives name. It is built on a rock, in a peninſula, and can only be approached on the land-ſide by a very narrow paſſage between the mountain and the ſea: croſs this paſſage the Spaniards have drawn a line, and fortified it, to prevent the garriſon's having any communication with the country.

The Streights of Gibraltar are about twenty-four miles long, and fifteen broad.

GIESEN, a town of Germany, thirty miles north of Francfort.

GIFT, in law, a conveyance, by which either lands or goods are paſſed: it is of larger extent than a grant, being applied to things moveable and immoveable.

A gift may be by deed, by word, or in law: thus, all a perſon's goods and chattels, except in ſome ſpecial caſes, may be given without deed; though ſuch a gift is liable to ſuſpicion. When ſuch a gift is made in ſatisfaction of a debt, it ſhould be done before witneſſes of credit; that the goods and chattels be, at the ſame time, appraiſed to the full value; and that the gift be expreſly made in full ſatisfaction of the debt.

As to gifts in law, where a man is married, all the goods and chattels of his wife belong to the huſband; alſo, if a perſon be made executor of a will, by gift in law, all the teſtator's goods are his, after paying the teſtator's debts.

And as to deed of gift, all things that lie in livery, as meſſuages, lands, woods, &c. may be given or granted in fee for life, or years, at firſt; and be aſſigned over forever, afterwards. Such a deed may be made upon condition; and, if it be of goods and chattels, the delivery of a ſixpence is a good ſeiſin of the whole.

GIGANTIC, ſomething of a monſtrous ſize, like that of giants. See GIANT.

GIGG, or JIGG, in muſic, denotes a briſk and lively air; or an airy kind of dance, to a ſprightly meaſure.

GIGOT-BRANCH, in the manege. See the article BRANCH.

GILAN, a province of Perſia, bounded by the Caſpian ſea on the north. Its capital is a city of the ſame name: eaſt longit. 48°, and north lat. 37°.

GILBERTINES, a religious order founded in England by St. Gilbert, in the reign

of Henry I. The nuns follow the rule of St. Benedict, and the monks that of St. Auguftin. There were many monafteries of this order in different parts of England.

GILD, or GUILD. See GUILD.

GILDING, the art of fpreading or covering a thing with gold, either in leaf or liquid. See the article GOLD.

We have this advantage over the antients, in the manner of ufing and applying the gold, that the fecret of painting in oil, lately difcovered, furnifhes us with means of gilding works, capable of enduring all the violences of time and weather, which theirs could not.

There are feveral methods of gilding in ufe among us, as gilding in water, gilding in oil, gilding by fire, &c. of each of which in order.

The method of water-GILDING. Water-gilding requires more preparation than oil-gilding, and is chiefly on wooden works, and thofe made of ftucco; and thefe two muft be fheltered from the weather. A fize is ufed for this way of gilding made of fhreads, &c. of parchment or gloves boiled in water to the confiftence of a jelly. If the thing to be gilt be of wood, it is firft wafhed with this fize, boiling hot, and then fet to dry; and afterwards with white paint mixed up with the fame fize. Some ufe fpanifh white for this purpofe, and others plafter of Paris, well beaten and fifted. This fized paint muft be laid on with a ftiff brufh; which is to be repeated feldomer or oftener according to the nature of the work, as ten or twelve times in flat or fmooth works, but feven or eight will be fufficient in pieces of fculpture. In the former cafe they are applied by drawing the brufh over the work, in the latter by dabbing it. When the whole is dry, they moiften it with fair water, and rub it over with feveral pieces of coarfe linen, if it be on the flat; if not, they beat or fwitch it with feveral flips of the fame linen, tied to a little ftick, to make it follow and enter all the cavities and depreffures thereof.

Having thus finifhed the white, the next thing to be done, is to colour it with yellow ochre: but if it be a piece of fculpture in relievo, they firft touch it up, and prepare the feveral parts, which may have happened to have been disfigured, by the fmall iron inftruments, as gouges, chiffels, &c. The ochre ufed for this purpofe muft be well ground and fifted, and mixed up with the fize before-mentioned. This colour is to be laid on hot; and in works of fculpture, fupplies the place of gold, which fometimes cannot be carried into all the depreffures and cavities of the foliages and other ornaments.

A lay is alfo applied over this yellow, which ferves for the ground on which the gold is to be laid: this lay is ufually compofed of armenian bole, blood-ftone, black lead, and a little fat; to which fome add foap, and oil of olives; others, burnt-bread, biftre, antimony, glafs of tin, butter, and fugar-candy. Thefe ingredients being all ground down together with hot fize, three lays of this compofition is applied upon the yellow, the one after the other has been dried; being cautious not to put any into the cavity of the work to hide the yellow.

The brufh, ufed for this purpofe, muft be a foft one; and when the matter is become very dry, they go over it again with a ftronger brufh, to rub it down, and take off the fmall grains that ftick out, in order to facilitate the burnifhing of the gold.

To be prepared for gilding, you muft have three forts of pencils; one to wet, another to touch up and amend, and a third to flatten; alfo a gilding cufhion, for fpreading the leaves of gold on when taken out of the book; a knife to cut them, and a fquirrel's tail fitted with a handle; or elfe a piece of fine foft ftuff on a ftick, to take them up directly and apply them.

You are firft to begin with wetting your pencils; by which the laft lay laid on with water is moiftened, that it may the better receive and retain the gold. Then you are to lay the leaves of gold on the cufhion, and if whole, you muft take up with the fquirrel's tail, but if in pieces, with the other inftrument, or the knife wherewith they are cut, and lay and fpread them gently on the parts of the work you had moiftened before. If the leaves, as they frequently do, happen to crack or break in laying on, thefe breaches muft be made up with fmall bits of leaf, taken up upon the repairing pencil, and the whole work is to be fmoothed either with the fame pencil, or another fomething larger; the gold being preffed into the dents, into which it could not be fo eafily carried by the fquirrel's tail.

The work having been thus far gilded, muft be fet to dry, in order to be burnifhed or flatted. See BURNISHING and FLATTING.

The

The laſt operation is the applying the vermeil in all the little lines and cavities; and to ſtop and amend any little faults with ſhell-gold. The compoſition called vermeil is made of gum guttæ, vermilion, and a little of ſome ruddy-brown, ground together with venetian varniſh and oil of turpentine. Some gilders, inſtead of this, make ſhift with fine lacca, or dragon's blood, with gum-water.

Sometimes inſtead of burniſhing the gold, they burniſh the ground or compoſition laid on the laſt before it, and only afterwards waſh the part over with the ſize. This method is chiefly practiſed for the hands, face, and other nudities in relievo: which, by this means, do not appear ſo very brilliant as the parts burniſhed, though much more ſo than the parts perfectly flat.

To gild a piece of work, and yet preſerve white grounds, they apply a lay of ſpaniſh white, mixed with a weak fiſh-glue on all the parts of the ground whereon the yellow or the laſt lay might run.

The method of GILDING *in oil.* This operation requires much leſs apparatus than that before-mentioned. The baſis or matter whereon the gold is laid, in this method, is the remains of colours found ſettled to the bottom of the pots in which painters waſh their pencils. This matter, which is very viſcid or ſticky, is firſt ground, and then paſſed through a linen-cloth, and thus laid on the matter to be gilt, after it is waſhed once or twice over with ſize; and if it be wood, with ſome white paint.

When this is almoſt dry, but yet is ſtill unctuous enough to catch and retain the gold, the leaf-gold is laid on, either whole, if the work be large, or cut to pieces, if ſmaller: the leaves of gold are taken up and laid on with a piece of fine, ſoft, well-carded cotton; or ſometimes by a palate for the purpoſe, or ſometimes with the knife with which the leaves were cut, according to the parts of the work that are to be gilded, or the breadth of the gold that is to be laid on. As the gold is laid on, they paſs over it a coarſe ſtiff pencil or bruſh, to make it ſtick and as it were incorporate with the ground; and after this they mend any cracks that may have happened in it, either with the ſame pencil or one that is ſmaller, as has been ſhewn before in water-gilding.

This kind of gilding is chiefly uſed for domes and roofs of churches, courts, banquetting-houſes, *&c.* and for figures of plaſter of Paris, lead, *&c.*

The method of GILDING *with liquid gold.* This is performed by gold amalgamated with mercury, in the proportion of about an ounce of mercury to a dram of gold. To perform this, they heat a crucible red-hot, and then put the gold and mercury into it, ſtirring them gently about till the gold be found melted, and incorporated into a maſs with the mercury. When this is done, they caſt them into water, to waſh and purify them; and out of that into other waters, where the amalgama, which is almoſt as liquid as if there were nothing but quick-ſilver in it, may be preſerved a long time for uſe.

Before they proceed to lay this amalgamated gold on the metal, they firſt render the metal rough, by waſhing it over with aqua fortis, or aqua ſecunda; and afterwards rinſe the metal in fair water, and ſcour it a little with fine ſand, and then it is ready for the gold.

They next cover over the metal with the mixture of gold and mercury, taking it up with a ſlip of copper, or a bruſh made of braſs-wire, ſpreading it as even as poſſible, to do which they wet the bruſh from time to time in fair water. Then they ſet the metal to the fire, upon a grate, or in a ſort of cage, under which ſtands a pan of coals; and in proportion as the mercury, evaporating and flying off, diſcovers the places where gold is wanting, they take care to ſupply them, by adding new parcels of amalgama.

Then the work is rubbed over with the wire-bruſh, dipt in beer or vinegar, which leaves it in a condition to be brought to a colour which is the laſt part of the proceſs, and which the gilders keep to themſelves as a mighty ſecret.

The method of GILDING *by fire on metal.* To prepare the metal, they ſcratch it well, or rake it; then poliſh it with a poliſher; and afterwards ſet it to the fire to blue, *i. e.* to heat, till it appear of a blue colour. When this has been done, they clap on the firſt lay of leaf gold, rubbing it lightly down with a poliſher; and expoſe it thus to a gentle fire. They uſually give it but three ſuch lays, or four at the moſt, each lay conſiſting of a ſingle leaf for common works, and of two for extraordinary ones: after each lay, it is ſet a-freſh to the fire; and after the laſt lay, the gold is in condition to be burniſhed.

To gild paper. Grind bole-armoniac with rain-

rain-water, and give one laying of it; when it is dry, take glair of eggs, and add to it a little sugar-candy and gum-water, which lay over the former, and upon this, when it is dry enough, lay leaf-silver, or leaf-gold.

To gild the leaves of books. Take bole-armoniac, eight penny-weight; sugar-candy, two penny-weight; mix and grind them with glair of eggs: then on a bound book (while it is in the press, after it hath been smeared with glair of eggs, and is dried) smear the said composition, let it dry, then rub it well and polish it; then with fair water wet the edges of the book, and suddenly lay on the gold, press it down gently with cotton, let it dry, and then polish it with a tooth.

GILDING *of china* or *porcelain ware.* See the article PORCELAIN.

GILL, a measure of capacity, containing a quarter of a pint. See PINT and MEASURE.

GILL is also a name for ground-ivy, which, being infused in ale, makes what is known by the name of gill-ale; a sort of medicated ale, said to be abstersive and vulnerary.

GILLA VITRIOLI, a name sometimes given to the emetic salt of vitriol. See the article VITRIOL.

GILLS, *branchiæ*, in ichthyology. See the article BRANCHIÆ.

GILOLO, a large island of the Pacific ocean, lying between 1° south latitude and 2° north latitude, and between 125° and 128° east longitude.

GILOLO is also the name of the capital of the above island, situated in 40′ north latitude.

GILT-HEAD, *aurata*, in ichthyology, the sharp-backed sparus, with a crooked gold-coloured line between the eyes. It is a very beautiful fish, the ground-colour of whose body is an olive-brown, but elegantly variegated with a number of different colours. See SPARUS.

GILT-VARNISH. See VARNISH.

GIN, or GENEVA, among distillers. See the article GENEVA.

GIN, in mechanics, a machine for driving piles, fitted with a windlass and winches at each end, where eight or nine men heave, and round which a rope is reeved, that goes over the wheel at the top: one end of this rope is seized to an iron-monkey, that hooks to a beetle of different weights, according to the piles they are to drive, being from eight to thirteen hundred weight; and when hove up to a cross-piece, near the wheel, it unhooks the monkey, and lets the beetle fall on the upper end of the pile, and forces the same into ground: then the monkey's own weight over-hauls the windlass, in order for its being hooked again to the beetle. See the article ENGINE.

GINGEN, an imperial city of Germany, twenty miles east of Ulm: east lon. 10°, and north lat. 48° 36′.

GINGER, *zinziber*, in botany. See the article ZINZIBER.

The root of this plant is too well known to need any description: it will be sufficient to observe, that it is of the tuberous kind, knotty, crooked, and irregular, and divaricated into many branches, of a pale yellowish colour when broken, and, like the contrayerva, of a fibrous structure. This root is of a very hot, acrid, and pungent taste, though aromatic withal, and of a very agreeable smell.

Ginger is too cheap to be sophisticated, and too well known to need any directions about the choice of it; it may only be observed that the hardest and firmest pieces are the best. The Indians are very fond of ginger; they eat both the young shoots of the leaves, and the roots themselves, cut small, in their sallads and broths; and they make an excellent sweetmeat of them, preserving them with sugar. Ginger is an excellent carminative and stomachic; it assists digestion, expels flatuses, and takes off colic pains, often almost instantaneously. It is also highly esteemed by some as a cephalic, and is particularly said to strengthen the memory. It is often used as a corrective to purging medicines, and has the credit of being a great provocative to venery, especially in the preserved state. It may be given in powders, from two or three to ten, twelve, or fifteen grains; but it is seldom given in such large doses, on account of its acrimony. It is used in decoctions from one dram to two or three, to the quart. It is an ingredient in the venice treacle, mithridate, and diascordium, and in many other of the compositions of the shops; and is very frequently used in carminative and stomachic powders, in extemporaneous prescription.

Method of preserving GINGER. Wash the ginger, and lay it to steep for ten or twelve days, in white-wine and water, stirring them every day; then to a pound of roots allow two quarts of white-wine, and about a pint of lemon juice; boil these

these together for about a quarter of an hour: then add two pounds and a half of fine sugar, and boil it to a syrup, scumming it as it rises; then set it by in a glazed pan till the next day, and afterwards boil it again in the syrup, for half an hour; then set it by till the next day, when boiling it again, let it cool; repeating this till the ginger is clear: after which put it into glasses, and cover them with paper.

This is a fine sweet meat for the winter-season.

GINGER BREAD, a richer kind of bread, the flavour and taste whereof are heightened and improved with spices, and particularly with ginger, whence the name.

The preparation of ginger-bread is as follows: grate two penny white loaves into two pounds of almonds well blanched and pounded; then add two ounces of ginger, finely scraped, liquorice, and anise seed in powder, of each half an ounce; add to these five or six spoonfuls of rosemary-water; and knead all into a paste, with a pound of sugar, mould it, and roll it thin, then print it, and dry it in a stove. Others make it of treacle, citron, lemon, and orange-peel, with candied ginger, coriander, and carraway-seeds, mixed up with as much flour as will make it into a paste.

GINGER-WINE is made as follows: take three gallons of water, an ounce of race-ginger, and three pounds of sugar; boil them for an hour, and then put into it three lemons, and a little good yeast; close up the vessel, and let it stand five days: if it has so worked as to be clear in that time, it may be bottled; if not, let it stand longer, until it has worked sufficiently; and in ten days after it may be drank.

GINGIVÆ, the GUMS, in anatomy, a hard sort of flesh, investing the alveoli, or sockets of the teeth.

The gums consist of the common membrane of the mouth, and the periosteum of the jaws, to which they adhere very closely and firmly. They are furnished with a vast number of blood-vessels, whence their florid red colour; and they serve for the covering of the jaws, and the keeping the teeth fast in their sockets.

GINGLYMUS, γιγγλυμος, one of the three subdivisions of that kind of articulation called diarthrosis. See the articles ARTICULATION and DIARTHROSIS.

The ginglymus is that juncture of the bones wherein they mutually receive and are received by one another, as is the case of the articulation of the humerus and cubitus. See HUMERUS, &c.

The ginglymus is again subdivided chiefly into three kinds; the first is when the same bone at the same extremity receives, and is reciprocally received by another bone, after the manner of an hinge, as that of the cubitus and humerus: the second is when a bone receives another at one of its extremes, and is received into another, as the vertebræ do: the third is that where a bone is received into another after the manner of a wheel, or the axis of the wheel in a box, such is that of the second vertebra of the neck in the first.

GINSENG, in botany. See the article PANAX.

The root of the ginseng is of an oblong figure, never growing to any great size, being generally about four or five inches long, and its thickness that of one's little finger. It is of a firm texture, its surface is furrowed and wrinkled in different places. It is of a brownish colour on the outside, and somewhat yellowish within; and is so pure and fine, that it seems transparent. The top of the root, when it is sent entire to us, is found composed of knots, or tubera, placed over one another in an irregular manner: these are formed of the bottoms of the decayed stalks of the several preceding years. When the root is fair and entire, it is easy to know by these how old it is; but very old roots not being so much in repute, the people who gather ginseng have often the precaution to cut off some, or even all those knobs, before they dry the root.

Ginseng is of a very agreeable and aromatic smell, tho' not very strong; its taste is acrid and aromatic, and has somewhat bitter in it. It is to be chosen sound and firm, moderately heavy, not too tough, and of a good smell. Before it be bought, it will be prudent to cut every root thro', for the Chinese, of whom we have it, frequently find a way to introduce pieces of lead into it, to increase the weight.

The Chinese and Tartars collect the root of this plant with infinite pains, at two seasons of the year, spring and autumn. They are forbid to touch them with any iron instrument, so that they can only clean them with wooden knives. They wash them in a decoction of millet-seed, and

and afterwards hang them over the fumes of the ſame liquor, which they boil in conſiderable quantities for that purpoſe, in a cloſe veſſel, in the upper part of which the root is ſuſpended, over the ſurface of the liquor: after this they dry it for uſe, thus it becomes tranſparent. The ſmall fibres which are taken off, they boil in water, and make an extract of them, which they uſe in the ſame intention with the root.

The Chineſe value the ginſeng ſo highly, that it ſells with them for three times its weight in ſilver. They, as well as the Aſiatics in general, think the ginſeng almoſt an univerſal medicine: they have recourſe to it in all diſeaſes, as the laſt remedy, and readily give themſelves over when it will not cure them; but the virtues moſt generally aſcribed to it, are thoſe of a reſtorative, a provocative, and a cordial. It is famous in the eaſt for giving ſtrength to thoſe who have diſabled themſelves by the too free uſe of women: there they alſo recommend it greatly in the ſmall-pox, fevers of all kinds, diſorders of the ſtomach and bowels, and tell us that diarrhœas and dyſenteries are cured by it: but they caution people not to give it in too large doſes to perſons of a florid ſanguine conſtitution, on whatever occaſion it may be neceſſary to them. The european phyſicians eſteem it a good medicine in convulſions, vertigoes, and all nervous complaints, and recommend it as one of the beſt reſtoratives known.

Its doſe is from ten grains to twenty, in powder; and from one dram to two to the pint, in infuſions.

GIOVENAZZO, a biſhop's ſee in the kingdom of Naples, twelve miles weſt of Barri.

GIRACE, a city and port-town of Calabria, about thirty-ſix miles north-eaſt of Reggio.

GIRANDOLE, a kind of branched candleſtick. See the article CANDLESTICK.

GIRDERS, in architecture, ſome of the largeſt pieces of timber in a floor.

Their ends are uſually faſtened into ſummers and breaſt-ſummers, and joiſts are framed in at one end to the girders.

The ſize of girders and ſummers, upon the rebuilding of London, were ordained by act of parliament, to be in length from ten to twenty-ſix feet, in breadth from eleven to ſeventeen inches, and in depth from eight to fourteen inches. It was alſo ordained by the ſame ſtatute, that no girder or ſummer ſhould be leſs than ten inches in the wall, and that their ends ſhould be laid in loam; as alſo that they be of good hearty oak, as free from knots as may be, becauſe that will be the leaſt ſubject to breaking, and may with more ſafety be relied on in this croſs and tranſverſe work.

GIRDING-GIRT, in the ſea-language. A ſhip is girt, or hath a girding-girt, when her cable being ſo tight, or ſtrained, upon the turning of the tide, ſhe cannot get over it, but lies acroſs the tide.

GIRDLE, *cingulum*, or *zona*, a belt or band of leather, or other matter, tied about the reins, to keep that part more firm and tight.

The Romans always wore a girdle, to tuck up the tunica, when they had occaſion to do any thing: this cuſtom was ſo general, that ſuch as went without girdles, and let their gowns hang looſe, were reputed idle diſſolute perſons.

It was antiently the cuſtom among us, for bankrupts and other inſolvent debtors to put off and ſurrender their girdle in open court; the reaſon whereof was, that our anceſtors uſed to carry all their neceſſary utenſils, as purſe, keys, &c. tied to the girdle: whence the girdle became a ſymbol of the eſtate.

Virgin-GIRDLE. It was the cuſtom among the Greeks and Romans, for the bridegroom to untie his bride's virgin-girdle, before he took her to his embraces. See the article BRIDEGROOM.

This girdle was made of ſheeps-wool; it was tied in the herculean knot, and in bed the huſband untied it, as a happy preſage of his having as many children as Hercules, who at his death left ſeventy behind him. The poets attribute to Venus a particular kind of girdle, capable of inſpiring the paſſion of love. See the article CÆSTUS.

Quickſilver-GIRDLE, *cingulum ſapientiæ*, in medicine, a ſort of belt or girdle, invented by Rulandus, made with woollen-cloth ſufficiently impregnated with quickſilver, killed with hog's lard.

This is ſewed up in a linen-cloth, which is applied to the ſkin, about the hypochondria, in diſorders of the itch, phthiriaſis, ulcers, and in caſes where there is no abſolute neceſſity for exciting a ſalivation. The patient's body muſt be kept warm, and defended from the cold of the external air, otherwiſe the belt, which is of itſelf highly ſafe, becomes very dangerous, as the acceſs of the external cold during its uſe, according to

Etmuller, endangers a falivation, petechial fever, or other diforders. Bartholine informs us, that this girdle proves mortal, when applied to patients who are either too young, weakened by difeafes, or of a cacochymic habit of body.

Chriftians of the GIRDLE, the chriftians of Afia, particularly thofe of Syria and Mefopotomia, who to this day wear a large leathern girdle, being enjoined thereto by Motavakkel, tenth caliph of the family of the Abaffides, in the year 856, as a badge of their profeffion.

Order of the GIRDLE. See CORDELIER.

GIRDLE, in architecture. See CINCTURE.

GIRGE, a city of upper Egypt, on the weft fide of the Nile; eaft lon. 32°, and north lat. 26°.

GIRKIN, a term ufed by gardeners for a fmall kind of cucumber. See CUCUMBER.

GIRLE, among fportfmen, denotes the roebuck in its fecond year.

GIRONNE, a large city and bifhop's fee of Spain, in the province of Catalonia, forty-five miles north-eaft of Barcelona: eaft lon. 2° 35′, and north lat. 42°.

GIRONNE', or GIRONNY, in heraldry, a coat of arms divided into girons, or triangular figures, meeting in the center of the fhield, and alternately colour and metal. See plate CXI. fig. 3.

GIRT, in the menfuration of timber, denotes the circumference of a tree. See the article TIMBER.

GIRT, among builders, a term fometimes ufed for fillet. See the article FILLET.

GIRTHS *of a faddle*, the ftrong canvas-ftraps, which, being buckled under a horfe's belly, ferve to fix the faddle. See the article SADDLE.

GISBORN, a market-town of Yorkfhire, fifty miles weft of York.

GISBOROUGH, another market-town of Yorkfhire, thirty-feven miles north of York.

GISON, or GEISON, in jewifh antiquity, fignifies, according to Jofephus, a little wall, about breaft high, made round the temple of Jerufalem, and round the altar of burnt facrifices, to keep the people at a diftance. This author, in his books of antiquities, makes the gifon three cubits high, and but one in his hiftory of the jewifh war.

GISORS, a city of Normandy, in France, twenty-eight miles fouth eaft of Rouen: eaft lon. 1° 25′, north lat. 50° 10′.

GIVEN, among mathematicians and philofophers, the fame with data. See the article DATA.

GIVET, a town of the bifhopric of Liege, twenty miles fouth of Namur.

GIUSTANDIL, a town of european Turky, in the province of Servia: eaft long. 24°, north lat. 43°.

GIULA, a city of Hungary, fubject to the houfe of Auftria: eaft long. 21° 35′, north lat. 46° 38′.

GLABELLA, in anatomy, the name by which fome call the fpace between the eye-brows, as being fmooth and void of hair.

GLACIS, in building, an eafy, infenfible flope, or declivity.

The defcent of the glacis is lefs fteep than that of the talus. In gardening, a defcent fometimes begins in talus, and ends in glacis. See the article TALUS.

The glacis of the corniche, is an eafy imperceptible flope in the cymatium, to promote the defcent and draining off the rain-water.

GLACIS, in fortification, that mafs of earth which ferves as a parapet to the covered way, floping eafily towards the champaign, or field.

The glacis, otherwife called efplanade, is about fix feet high, and lofes itfelf by an infenfible diminution in the fpace of ten fathoms. See ESPLANADE.

GLADE, in gardening and agriculture, an opening and light paffage made through a wood, by lopping off the branches of trees along that way.

GLADIATORS, in antiquity, perfons who fought generally in the arena at Rome, for the entertainment of the people.

The gladiators were ufually flaves, and fought out of neceffity; though fometimes freemen made profeffion thereof, like our prize fighters, for a livelihood. The Romans borrowed this cruel diverfion from the Afiatics; and we find that the very priefts had their ludi pontificales, and ludi facerdotales. As from the earlieft ages of antiquity we read that it was cuftomary to facrifice prifoners of war to the manes of the great men that fell in the engagement, in procefs of time, they came to facrifice flaves at the funerals of all perfons of condition; but as it would have appeared barbarous to cut their throats like beafts, they were appointed to fight with each other, and to do their beft to fave their own lives by killing their adverfary. See the article BUSTUARII.

Hence arofe the mafters of arms called laniftæ, and men learned to fight. Thefe

lanistæ bought slaves to train up to this cruel trade, whom they afterwards sold to such as had occasion to exhibit shews. Junius Brutus, who expelled the kings, was the first that honoured the funeral of his father with these inhuman diversions at the sepulchre of the deceased; but afterwards they were removed to the circus and amphitheatres; and other persons, besides slaves, would hire themselves to this infamous office.

They were all first sworn that they would fight till death, and if they failed, they were put to death either by fire, swords, clubs, whips, *&c.* It was usual with the people, or emperor, to grant them life when they shewed no signs of fear. Augustus decreed, that it should always be granted them.

From slaves and freed men, the wanton sport spread to persons of rank, as we find in Nero's time. And Domitian exhibited combats of women in the night-time: we also read, that dwarfs encountered with one another. Constantine the great first prohibited these combats in the east, but the practice was not intirely abolished in the west before Theodoric king of the Ostrogoths, in the year 500.

When any person designed to entertain the people with a show of gladiators, he set up bills in the public places, giving an account of the time, the number and names of the combatants, and the circumstances whereby they were to be distinguished; each having his several badge, which generally was a peacock's feather: they also gave notice what time the show would last; and sometimes gave representations of these things in painting, as is practised among us, by those who have any thing to show at fairs, *&c.*

Upon the day appointed for the show, in the first place the gladiators were brought out all together, and obliged to take a circuit round the arena in a very solemn and pompous manner. After this, they proceeded, *paria componere,* to match them by pairs, in which great care was taken to make the matches equal. The first sort of weapons they made use of were staves, or wooden files, called rudes, and the second were effective weapons, as swords, poniards, *&c.*

The first were called arma lusoria, or exercitoria; the second, decretoria, as being given by decree or sentence of the prætor, or of him at whose expence the spectacle was exhibited.

They began to fence or skirmish with the first, which was to be the prelude to the battle, and from these, when well warmed, they advanced to the second, with which they fought naked. The first part of the engagement was called *ventilare, præludere*; and the second *dimicare ad certum,* or *versis armis pugnare.*

When any received a remarkable wound, either his adversary or the people used to cry out, *habet,* or *hoc habet.* If the vanquished surrendered his arms, it was not in the victor's power to grant him life: it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone empowered to grant this boon. The two signs of favour and dislike given by the people, were *premere pollicem,* and *vertere pollicem,* the former of which M. Dacier takes to be a clenching of the fingers of both hands between one another, and so holding the two thumbs upright close together, was a sign of the people's admiration of the courage shewn by both combatants; and at the same time for the conqueror to spare his antagonist's life: but the contrary motion, or bending back of the thumbs, signified the dissatisfaction of the spectators, and authorised the victor to kill the other combatant downright for a coward. The emperor saved whom he liked, if he was present at the solemnity, in the same manner.

After the engagement, several marks of favour were conferred on the victor, particularly a branch of palm-tree; and oftentimes a sum of money, perhaps gathered up among the spectators: but the most common rewards were the pileus and the rudis; the former being given only to such gladiators as were slaves, for a token of obtaining their freedom; but the rudis seems to have been bestowed both on slaves and freemen, with this difference, that it procured the former no more than a discharge from any further performance in public, upon which they commonly turned lanista: but the rudis, when given to such persons as, being free, had hired themselves out for these shows, restored them to a full enjoyment of their liberty. See the articles PILEUS, RUDIS, and LANISTA.

There were divers kinds of gladiators distinguished by the weapons, manner, time of fighting, *&c.* such were the andabatæ, catervarii, consummati, cubicu-

cubicularii, dimachæ, fiscales, &c.

GLADIOLUS, *gladiole*, in botany, a genus of the triandria-monogynia class of plants, the flower of which consists of six petals that unite at their bases: the fruit is an oblong, trilocular capsule, containing a great many triangular seeds.

The root of gladiole, or the common corn flag, is accounted discutient, and good in malignant and pestilential cases.

GLADIUS, a sword; whence *jus gladii*, or right of the sword, is used in our antient latin authors, and in our norman laws, for supreme jurisdiction: and it is probably from hence that, at the creation of an earl, he is *gladio succinctus*, to denote his having a jurisdiction over the county.

GLAMA, a species of peruvian camel, with the back even, and the breast gibbose. See the article CAMEL.

GLAMORGANSHIRE, a county of south Wales, bounded by Brecknockshire on the north, and by the Bristol channel on the south. Its capital is Landaff.

GLAND, in anatomy, a small body, formed by the interweaving of vessels of every kind, covered with a membrane, usually provided with an excretory duct, and destined to separate some particular fluid from the mass of blood, or to perfect the lymph. See BLOOD and LYMPH.

Many of the anatomical writers of the very first class, and among these some who have written professedly of the glands, and have made it their peculiar business to examine nicely into their nature, and explain their structure, have yet, from mere difficulty of ascertaining adequate ideas of the term, evaded giving a definition or general description of the glands; and in consequence of this, numberless errors, and an almost inextricable confusion, has crept into the study of this important part of the human structure.

Other authors, who have had more boldness, if not greater abilities than those who have avoided meddling with definitions of these parts, have ventured to establish what they call glands: but these differ so much from one another in what they would establish as general certainty, and have produced such imperfect and erroneous definitions, that they have all either included parts which themselves own not to be glands in the definition, or they have limited the term to some particular ones, and excluded what themselves and every body else allow to be glands out of the number.

Glands are parts of a peculiar structure: they are of various figures, colours, and consistencies, as they are destined to different offices. The antients supposed them formed of a different kind of flesh, from that of the rest of the body; but the parts to which they have given the name of glands, though they are as different from one another as possible in figure, size, and colour, yet they are easily known, and distinguished as glands by all the world; notwithstanding the difficulty of giving a definition or even a general character of a gland, which shall include all the true glands, and take in no other parts of the body with them.

Many writers on this subject have asserted, that wherever there is a secretion of any kind performed, there is a gland; but this is not true, for there are many secretions performed in the body, and those even of the largest and most important kind, where there are no glands to perform them: the chyle is secreted in the intestines without the assistance of glands; the semen is secreted in the testicles; and the pituita in the pituitary sinuses of the brain, where there are no glands at all. On the other hand also it is to be observed, that there are glands received and allowed by all writers as such, which do not appear to perform any secretions at all; and the antients themselves agreed in giving the name of glands to several parts, though they were not assured that they secreted any thing, nor even in some cases believed that they did. But Mery, in several papers in the Memoirs of the Paris Academy, not only proves that all the secretions are not performed by means of glands, but that many of the secretions of most importance to the body are performed without glands. We are to add also, that every beginner in anatomy, at this time, knows a gland to be such when he sees it, without knowing any thing of its use. There are therefore other characters by which a gland may be known, though by its office and use it cannot.

Other writers, of the number of whom is the great Malpighi, in dissections of particular bodies, having found vesicles

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in the brain, liver, kidneys, and other parts of the body, thence declared them to be glandulous in their ſtructure: but in theſe caſes, the bodies diſſected were all morbid ones; and as the ſame veſicles are not found in healthful ones, nor indeed any thing analogous to them, it is a ſufficient proof that they are not natural parts of their ſtructure; and beſides, veſicles and glands are different. See VESICULA.

It is evident that the antients called certain parts of the human body glands, and that for no other reaſon but becauſe they found them compoſed of a peculiar kind of fleſhy ſubſtance, of a peculiar habit, or external appearance, without paying any the leaſt regard either to their internal ſtructure, their ſpherical figure, (by which character ſome define them) or their uſe.

If it be aſked, ſays Heiſter, what this particular habit in the glands is? or how we are to know it? the anſwer is, that the peculiar complication and arrangement of the veſſels, from which there ariſes a form obviouſly diſtinguiſhable at ſight from the muſcles, the fat, the bones, the membranes, the veſſels, and in fine from every other part of the human fabric, which gives a ſufficiently certain, determinate and ſtriking notice of it.

The differences of the glands among themſelves, as eſtabliſhed by many authors, are very numerous: it will not be neceſſary to run into the whole diſquiſition; we ſhall only ſelect a few which are more generally eſtabliſhed than the reſt, and of more immediate and real uſe. We ſhall firſt divide them into two general kinds, the ſimple, called alſo conglobate glands, and the conglomerate. See the articles CONGLOBATE and CONGLOMERATE.

The glands differ alſo greatly in regard to their conſiſtence: ſome of them are conſiderably hard and firm, and others extremely ſoft and tender: of the latter kind in particular are the glands ſituated in the articulations of the bones of the ſeveral parts of the body.

They differ alſo very conſiderably in colour. Some of them are of a pale, whitiſh, red, or fleſhy colour; others of a ſtrong, deep red; others yellowiſh, or browniſh, and ſome evidently blackiſh.

Their differences in figure are as conſiderable alſo as thoſe in colour: ſome of them are round, others oval, others oblong, and many others of figures as different as well can be from any one of thoſe regular ones: the pancreas, the thyroide, and the thymus, are inſtances of this: ſome of them have obtained their names from their peculiar figure: of this number are the glandula pinealis, the miliares, and others. See the articles PANCREAS, THYROIDE, THYMUS, &c.

The uſes of the GLANDS are alſo as different as their colours or figures: ſome of them are ſalival, mucoſe, and lymphatic; others are mucilaginous, ſebaceous, and waxy; others lachrymal, pituitary, &c. and from theſe their ſeveral contents or ſecretions, they are termed lachrymal, &c. See the articles SALIVAL, LYMPH, MUCILAGINOUS, &c.

The ſituation of the GLANDS is another article in which they differ, and from which many of them have their ſeveral names; ſuch are the parotides, maxillares, linguales, thyroide, palatine, labial, jugular, cervical, axillary, inguinal, lumbary, inteſtinal, meſenteric, renal, &c. See the articles PAROTIDES, MAXILLA, &c.

And, finally, the ſize of the glands is a thing in which they differ moſt obviouſly and eſſentially.

Of the GLANDS *in particular.* The particular glands of the body, or ſuch as are truly and properly of this denomination, are, according to Heiſter, as follow; and firſt of the glands of the head.

In the ſinuſes of the dura mater, and out of them, at the ſides, there are found a number of ſmall glands deſcribed by Pacchonius; and there are ſometimes others viſible in the foveæ of the os frontis, and about the diviſions of the veſſels, between the dura mater and the arachnoides. Theſe glands ſeem deſtined for the ſecreting of a fluid to moiſten the dura mater. Other glands of the brain are the pineal gland, and the pituitary gland. See the articles PINEAL, PITUITARY, DURA MATER, and BRAIN.

In the exterior part of the head, that is, out of the cavity of the ſkull, we have the parotids, the maxillary glands, the ſublinguals, the linguals, the labials, the palatine, and the buccinals, which are diſtributed here and there about the membrane of the mouth; and are each deſcribed in their places. In the orbit alſo there is the lachrymal glands; under the eye-lids are the ceraceous or ſebaceous glands, the tonſils in the fauces, the mucoſe glands in the pituitary membrane of the noſtrils, and the ceruminoſe glands of the ears, each of which are deſcribed under

under their feveral heads. See the articles Eye and Ear.

The principal gland of the neck is the thyroides, befides which there are alfo found in the neck a great number of leffer ones, diftributed here and there among the mufcles and fat. Their figure, their number, and their fituations, vary in different fubjects; but in general thofe in the anterior part of the neck are called jugulars; and thofe in the hinder part, occipitales and cervicales. The ufe of thefe is hitherto uncertain; it is generally fuppofed that they are of fervice to the lymphatic veffels, but what fort of ufe they can be of to them, does not fo eafily appear. See the articles Thyroide, Jugular, Cervical, and Neck.

Ruyfch and Morgagni have alfo defcribed and figured glands in the epiglottis: and Morgagni has defcribed others in the other parts of the larynx, particularly about the arytænoide cartilages, as alfo in the trachea: but thefe are often fo fmall, that they are fcarce difcoverable in diffection.

The oefophagus, efpecially towards its upper part, has a great number of glands; and it is common to find a little aperture or ofculum in the center of each, which has much the appearance of an excretory duct.

In the thorax we meet with the gland thymus; as alfo with the glandulæ bronchiales: thefe laft are very obfervable glands, fituated externally in the larger divifions of the trachea and bronchia. They are of a blackifh colour; and their ufe like that of many others of the glands of this part of the body, is yet very little known. It had been long fuppofed that they ferved to fecrete a liquid which they difcharged into the bronchia, for the lubricating and moiftening thefe parts; but Vercellonius will have it, that they fecrete a fluid whofe ufe is to be affiftant in the digeftion of our food, and that they difcharge it into the oefophagus through certain extremely minute ducts. See the articles Thorax, Thymus, Bronchia, &c.

About the fifth vertebra of the back, there is fometimes found in the thorax a remarkable gland adhering to the pofterior part of the oefophagus: this is ufually called glandula dorfalis. It is, in different fubjects, of various fizes. It is often of the fize of a kidney-bean; fometimes of that of an almond, and fometimes confiderably larger; in others, it is much lefs than the fmaller, and fometimes it is wholly wanting; or at leaft fo extremely minute and inconfiderable, that the beft diffectors are not able to find it. Sometimes alfo two glands are found in this part in the place of one. Vercellonius is of opinion, that this gland is alfo placed there for the fecretion of a fluid ferving to affift the digeftion of our food in the ftomach: but Fantonus, and fome others, fuppofe, that thefe glands difcharge a fluid of a mucous nature into the cavity of the oefophagus: feveral authors affirm, that in dogs thefe glands are found tumid, and inhabited by a number of oblong and flender red worms. See Dorsum, Vertebræ, and Oesophagus.

In the abdomen there are very confiderable numbers of glands: the largeft of them is the pancreas; after this in fize come the glandulæ renales, or capfulæ atrabilariæ; after thefe the maferiacs, and the inteftinals of Brunner and Peyer in the inteftines. See Abdomen, &c.

The glands of the ftomach are very eafily diftinguifhable in dogs and hogs; but in human fubjects, it is difficult to find them: many anatomifts have doubted them. Morgagni, however, difcovered them fo fairly in human fubjects, that there is no doubt left about them.

About the vertebra of the loins, near where the receptaculum chyli is fituated, and about the os facrum, and the divifions of the iliac veffels, are many glands of various fizes and figures: they are commonly called lumbares, facræ, and iliacæ, and they have numerous lymphatics entering into them, and difcharging their contents into the receptaculum chyli. The lumbar glands have been fometimes found fwelled to the bignefs of a man's fift.

In the concave part of the liver, about the ingrefs of the vena portæ and the neck of the gall-bladder; as alfo about the fpleen, near the ingrefs of the veffels, there are frequently found conglobate glands, of about the bignefs of a kidney-bean: thefe are called by authors hepatic glands, cyftic glands, and by other names formed from the names of the parts they are near; and they feem to ferve the lymphatic veffels. See Liver.

About the left orifice of the ftomach, there fometimes alfo is found, according to Vercellonius, a gland which he fays is equal to a kidney-bean in fize; he alfo

fays

ſays that it has ducts opening into the cavity of the ſtomach. In hogs this gland is very conſpicuous, but in human ſubjects it is not ſo.

Many authors have told us, that in the omentum, in every part where the fat lies, there are a number of glands whoſe office it is to ſecrete it. Diſſection ſhews us a few about that part where it is joined to the pylorus; and as to the reſt, it is not neceſſary that there ſhould be glands, becauſe there is fat: for that may be, and is, indeed, in great abundance ſecreted immediately from the arteries.

In the gall-bladders of oxen there are often found a number of ſmall glands of a yellow colour, not unlike the ceruminous glands in the auditory paſſage. In human ſubjects the ſame kind of glands are alſo ſometimes found. The bladder and the ureters have alſo ſometimes a number of ſmall glands, but they are very indeterminate in number and ſize, and are not always indeed found in the ſame place, eſpecially about the ureters. Thoſe about the bladder are uſually ſituated towards the neck of it, and are ſometimes tolerably conſpicuous.

In the parts of generation of man there occur, 1. The glandulæ Cowperi. 2. The glandulæ Littri. And, 3. The odoriferous glands of Tyſon. See PENIS. As to the latter ones, thoſe of them which are ſituated in the interior part of the prepuce, are much more obvious than thoſe about the coronæ penis, where it is very difficult to diſtinguiſh them from the nervous papillæ of the ſame part. 4. We meet with the proſtatæ. 5. The glands of the veſiculæ ſeminales: but theſe are rarely ſeen diſtinct. Terraneus alſo deſcribes ſix ſmall glands in the urethra virilis. See the articles PREPUCE, PROSTATÆ, VESICULA, and URETHRA.

In the parts of generation in women, we are to refer to the number of the glands, 1. Thoſe which Morgagni diſcovered in the nymphæ: theſe have a very near alliance with the glandulæ odoriferæ of the penis in men. 2. Authors tell us of glands in the female as well as the male urethra: but the diſſector will find only little foramina and ducts in the place of them. 3. About the extremity of the urethra, however, in the vagina, there are ſometimes found evident glands, ſituated beneath them: theſe as well as the glands of the nymphæ, are often very turgid in the time of parturition. 4. The veſicles ſometimes met with near the internal orifice of the uterus, and taken by ſome for a new ovary, are not properly glands, tho' ſome people have been very poſitive that they were ſuch; having nothing of the habit and peculiar appearance of glands, and being in truth only veſicles. 5. Some have alſo maintained that there are glands in the uterus, by which the menſtrual diſcharges are ſecreted; but this notion ariſes only from the falſe hypotheſis, that where there are no glands, there can be no ſecretion. See the articles VAGINA and UTERUS.

Among the glands which belong to the articulations, and the extremities, we are to mention firſt the axillary ones. 2. The inguinal glands; theſe laſt, being ſituated on each ſide in the groin near the crural veſſels, are in various diſeaſes apt to grow tumid, and inflamed. Abſceſſes are often formed in them; but their uſe in the body is not eaſily underſtood. 3. The glands, called from their diſcoverer glandulæ Harveianæ, in the articulations: they are alſo called from the matter they ſecrete glandulæ mucoſæ. Theſe are the ſofteſt of all the glands in the body; they ſecrete a mucous ſoft fluid, which ſerves to lubricate the joints, and render their motions eaſy, and to prevent their growing dry, and cohering together.

About the ſcapula, the flexure of the elbow, the hand, the knee, and the foot, there are alſo found here and there ſome ſmall glands; as alſo in ſome places between and among the muſcles: but as their number and ſituation, as well as their ſize and figure, are very uncertain and variable, it is not neceſſary to recount them here.

We are, however, yet to ſpeak of the cutaneous glands. Verheyen tells us, that Steno had diſcovered, that there is a gland ſituated under every diſtinct pore of the ſkin, from whence there ariſes a veſſel for the conveyance of the matter of ſweat, which terminates at the ſurface of the cutis: and hence Verheyen, though he does not ſay that he had ever ſeen any of theſe glands himſelf, ventures to give them a place among the parts he deſcribes; and calls them ſubcutaneous glands. The pores of the ſkin are ſo extremely numerous, that if, according to theſe authors, there were a gland belonging to every one of them, the glands muſt be almoſt infinite in number.

number. But in diffection, when the cutis has been carefully cleared from the fat that is under it, it is certain no such glands are seen, either in the separated fat, or on the lower surface of the cutis: there are indeed always found little portions of the fat here and there insinuating themselves into the little foveolæ, or holes in the cutis; but pieces of fat will be distinguished from glands, with very little difficulty by an expert anatomist. From this, and from innumerable searches after these glands, it appears, that there are indeed no such glands as those called subcutaneous. See the article CUTIS.

Indurations of the GLANDS. Indurated swellings of the glands from viscid humours, which at length turn callous and cancerous, arise from an obstruction of the vessels, especially in the glands, and from thick gross humours. They are known from hard tumours, which are generally moveable and indolent: in this state they are called indurated glands; and if they do not digest and suppurate in a short time, they grow harder, and are called scirrhous glands; and if these, especially in the breasts, begin to corrode and are painful, they are termed carcinomata, or incipient occult cancers. See the articles SCIRRHUS and CANCER.

The indurated glands of the neck in boys proceed from voracity and a bad diet, which, according to Heister, are to be cured by correcting the corrupt humours, by external exercise, by the force of nature, and a length of time: when this is not performed, and they increase and multiply, they become scrophulous, and are called the king's evil; when they are large, they are called strumæ: but these are seldom indurated glands, but rather tunicated humours, which contain various bad humours in bags, and increase to a wonderful size, inducing different grievous evils. See the articles, DIET, EXERCISE, SCROPHULA, CYST, TUMOUR, *&c.*

It is customary to attempt the cure by various external remedies, but these are scarcely sufficient, without correcting the intemperies of the humours; for otherwise they generally grow worse. The remedies for indurated glands are emollients and dissolvents; such as the infusions and decoctions of resolving roots, woods, and herbs, taken twice or thrice a day; such as the roots of sarsaparilla, with guaiacum; of the roots of sarsaparilla, china, and sassafras-wood; or of the roots of scrophularia or vincetoxicum; likewise a decoction of guaiacum, with liquorice-root, with the infusion and decoction of rosemary with sugar. See the articles EMOLLIENTS, DISSOLVENTS, *&c.*

Besides these, such powders as attenuate the viscid blood, such as the pulvis ad strumas, of the augustan dispensatory, to which may be added a grain of cinnabar or mercurius dulcis; likewise the crude powder of antimony, especially with a grain of mercurius dulcis in every dose, which is very useful in dissolving the glands in the neck of boys. The powder of millepedes, from half a scruple to a scruple, with a grain of mercurius dulcis, is an approved remedy in this case, and in hard tumours of the viscera. Some greatly praise ethiops mineral; which remedies are to be continued a long while. As to diet, all austere, crude, gross flatulent aliment is to be avoided; winter potherbs, pulse, and the like. The quantity of food should likewise be lessened, cold unwholsome air avoided, as well as sadness and rest: externally, simple spirit of wine applied hot, or camphorated with a little saffron; likewise resolvent plasters with mercury, as also digestive bags of fragrant herbs and flowers. Dedier greatly recommends hot sea-sand applied to scirrhous breasts. Some commend oil of bricks and the balsam of sulphur of Rulandus, if rubbed often in a day therewith; in the room of which may be applied a distilled oil of soap, petroleum, dog's fat, and the martial ointment; after which a plaster of gum-ammoniac, or soap, or melilot, or sperma ceti must be laid thereon; when the tumour is softened, a plaster of oxycroceum may be properly used.

But when the salival, maxillary, or parotid glands are indurated, and the several remedies already mentioned prove unsuccessful, in order to preserve the patient from otherwise inevitable destruction, the dangerous operation of extirpating these glands must be attempted, in which great care and attention is required, as they adhere to considerable branches of the carotid artery; and that, in extirpating them, the patient may bleed to death, if not prevented by the hand of a skilful operator. For the operation Heister directs, that the surgeon be first provided with a good styptic-liquor, with a large quantity of lint, linen-rags, a

puff-

puff ball, as alſo ſome thick compreſſes, each larger than the other, and a roller of about ſix ells long: theſe being provided, the patient is to be ſeated in a proper light, with his head and hands ſecured by aſſiſtants; then the ſurgeon opens the integuments by a longitudinal inciſion, and, freeing them carefully from the tumour, divides their connecting arteries; hereupon the blood ruſhes forth ſo impetuouſly, that near a pound will be loſt, before the ſurgeon can lay down his knife, and apply the dreſſings; therefore, to ſave the patient, and ſuppreſs the hæmorrhage, he muſt conſtantly apply a bundle of the linen-rags, dipped in ſtyptic, and preſs them cloſe upon the divided arteries: the remaining cavity of the wound muſt be well filled with dry lint and rags, preſſed cloſe with his fingers, over which muſt be impoſed a large piece of puff-ball, with three or four compreſſes, each larger than the other; the whole being at laſt ſecured by the faſcia nodoſa, commonly uſed for arteriotomy in the temples: laſtly, it is to be obſerved, that when the tumour is uncommonly large, it may be more convenient to make a cruciform inciſion thro' the integuments, by which the tumour may be extracted more eaſily than by a longitudinal one. See STYPTIC, BANDAGE, CYST, TUMOUR, *&c.*

For the treatment of the wound, ſee the article WOUND.

With regard to the uſe of ſea-water in diſorders of the glands, ſee the article SEA.

GLANDERS, in the manege, a diſeaſe in horſes, conſiſting of a thick, ſlimy, corrupt humour, running from the noſtrils, of a different colour, according to the different degrees of malignity, or as the infection has been of a ſhorter or longer continuance; being white, yellow, green, black, or bloody.

Authors aſcribe this diſeaſe to various cauſes: ſome to infection; others, to a diſorder of the lungs; others, to the ſpleen; ſome to the liver; and others, to the brain. After it has been of ſo long a ſtanding, as that the mater is become of a blackiſh colour, which is uſually in its laſt ſtage, they ſuppoſe it to come from the ſpine; and hence they call it the mourning of the chine.

Kernels and knots are uſually found under the caul in this diſorder; and as theſe grow bigger and more inflamed, ſo the glanders increaſe more.

For the cure of the glanders, Mortimer gives the following receipt.

Take a pint of children's chamber-lye, two ounces of oil of turpentine; half a pint of white wine vinegar; four ounces of flower of brimſtone; half a handful of rue: boil this compoſition till it comes to a pint, and give it to the horſe faſting; and let him faſt after it ſix hours from meat, and twelve from water.

GLANDIVES, a city and biſhop's ſee of Provence, in France, ſituated on the river Var, twenty-ſix miles north-weſt of Nice: eaſt long. 6° 40′, north lat. 44°.

GLANDULAR, or GLANDULOUS, among anatomiſts. See GLANDULOUS.

GLANDULE, GLANDULA, a term uſed by anatomiſts to expreſs a ſmall gland. See the article GLAND.

GLANDULOUS, ſomething abounding with or partaking of the nature of glands. See the article GLAND.

GLANDULOUS BODY, *glanduloſum corpus*, a name by which ſome call the proſtatæ. See the article PROSTATÆ.

GLANDULOUS ROOTS, among gardeners, *&c.* denotes ſuch tuberoſe ones as are connected together by ſmall fibres. See the article ROOT.

GLANS, ACORN, in natural hiſtory. See ACORN.

GLANS, in anatomy, the anterior extremity of the penis, called by other different names, as the head of the penis, the nut of the penis, and the balanus of the penis. See the article PENIS.

The glans is compoſed of the epidermis and the corpus cavernoſum, which is continuous with the urethra. See the articles EPIDERMIS and CORPUS, *&c.*

Its ſurface is very ſmooth and poliſhed, and is very ſenſible to the touch, which is owing to a multitude of nervous papillæ diſtributed all over it; and are moſt obvious when the penis is erected. In the front of it is the urethra, and immediately under is inſerted the frænum or frenulum of the penis. The poſterior extremity of the glans, with its neck behind, is diſtinguiſhed by the name of the corona. See article CORONA.

GLANS is alſo uſed to denote the tip or extremity of the clitoris, from its reſemblance both in form and uſe to that of the penis. The principal difference conſiſts in this, that it is not perforated as is the glans of the penis. This glans is alſo covered with a preputium formed of the inner membrane of the labia. See the article CLITORIS.

GLANS is alſo taken for ſtrumous, or ſcrophulous tumors.

It alſo ſignifies a ſuppoſitory, or peſſary.

GLARIS, the capital of one of the cantons of Switzerland, of the ſame name, the inhabitants of which are both proteſtant and popiſh: it is ſituated thirty-five miles ſouth-eaſt of Zurich, in eaſt long. 9°, and north lat. 47°.

GLASGOW, a large city of Scotland, ſituated in Lanerkſhire, or Clydeſdale, on the river Clyde, twenty miles north-weſt of Lanerk, and forty miles weſt of Edinburgh, in 4° 8′, weſt long. and 55° 5′, north lat.

This is one of the moſt elegant towns in Scotland. It has an univerſity, and a good foreign trade.

GLASS, *vitrum*, a tranſparent, brittle, factitious body, produced by the action of fire upon a fixt ſalt and ſand, or ſtone, that readily melts.

The chemiſts hold, that there is no body but may be vitrified, or converted into glaſs; being the laſt effect of fire, as all its force is not able to carry the change of any natural body beyond its vitrification.

Antiquity and hiſtory of GLASS. When, or by whom, the art of making glaſs was firſt found out is uncertain: ſome will have it invented before the flood; but without any proof. Neri traces the antiquity of this art as far back as the time of Job: but Dr. Merret will have it as antient as either pottery, or the making of bricks: becauſe that a kiln of bricks can ſcarce be burnt, or a batch of pottery be made, but ſome of the bricks and the ware will be at leaſt ſuperficially turned to glaſs; ſo that it muſt have been known at the building of Babel, and as long before as the making of bricks was uſed. It muſt have been known, conſequently, among the Egyptians, when the Iſraelites were employed by them in making bricks. Of this kind, no doubt, was that foſſil glaſs mentioned by Ferrant. Imperat. to be found under-ground in places where great fires had been. The Egyptians indeed boaſt, that this art was taught them by the great Hermes. Ariſtophanes, Ariſtotle, Alexander Aphrodiſæus, Lucretius, and John the divine, put us out of all doubt that glaſs was in uſe in their days.

Pliny relates, that it was firſt diſcovered accidentally in Syria, at the mouth of the river Belus, by certain merchants driven thither by a ſtorm at ſea, who, being obliged to continue there, and dreſs their victuals, by making a fire on the ground, where there was great plenty of the herb kali; that plant burning to aſhes, its ſalts mixed and incorporated with ſand, or ſtones fit to vitrify, and produced glaſs: that this accident being known, the people of Sidon, in that neighbourhood, aſſayed the work, improved the hint, and brought it into uſe; and that this art has been improving ever ſince.

Venice, for many years, excelled all Europe in the fineneſs of its glaſſes, but of late the French and Engliſh have excelled the Venetians, ſo that we are no longer ſupplied with this commodity from abroad.

Nature and characters of GLASS. Naturaliſts are divided in what claſs of bodies to rank glaſs: ſome making it a concrete juice; others a ſtone; others again rank it among ſemi-metals; but Dr. Merret obſerves, that theſe are all natural productions, whereas glaſs is a factitious compound, produced by fire, and never found in the earth, but only the ſand and ſtone that form it; that metals are formed by nature into certain ſpecies; and that fire only produces them, by its faculty of ſeparating heterogeneous, and uniting homogeneous bodies: whereas it produces glaſs, by uniting heterogeneous matter, *viz.* ſalt and ſand, of both which it evidently conſiſts; 100 lb. weight of ſand yielding above 150 lb. of glaſs. The ſame learned doctor gives us a preciſe and accurate enumeration of the ſeveral characters, or properties of glaſs, whereby it is diſtinguiſhed from all other bodies, *viz.* 1. That it is an artificial concrete of ſalt and ſand, or ſtones. 2. Fuſible by ſtrong fire. 3. When fuſed, tenacious and coherent. 4. It does not waſte nor conſume in the fire. 5. When melted, it cleaves to iron. 6. When it is red hot, it is ductile, and may be faſhioned into any form; but not malleable; and capable of being blown into a hollowneſs, which no mineral is. 7. Frangible when thin, without annealing. 8. Friable, when cold. 9. Diaphanous, whether hot or cold. 10. Flexible and elaſtic. 11. Diſſoluble by cold and moiſture. 12. Only capable of being graven or cut with a diamond, or other hard ſtone; and emery. 13. Receives any dye or colour both externally and internally. 14. Not diſſoluble by aquafortis, aqua regia, or mercury. 15. Neither

Neither acid juices nor any other matter extract either colour, taſte, or any other quality from it. 16. Admits of poliſhing. 17. Neither loſes weight nor ſubſtance by the longeſt and moſt frequent uſe. 18. Gives fuſion to other metals, and ſoftens them. 19. The moſt pliable thing in the world, and that which beſt retains the faſhion given it. 20. Not capable of being calcined. 21. An open glaſs being filled with water in the ſummer-time, will gather drops of water on the outſide, juſt ſo far as the water on the inſide reaches; and a perſon's breath blown on it will manifeſtly moiſten it. 22. Little glaſs balls filled with water, mercury, and other liquor, and thrown into the fire; as alſo drops of green glaſs being broken, will fly aſunder with a great noiſe. 23. Neither wine, beer, nor any other liquor, will make it muſty, or change its colour, or ruſt it. 24. It may be cemented, as ſtones and metals. 25. A drinking-glaſs, partly filled with water, and rubbed on the brim with a wet finger, yields muſical notes, higher or lower as the glaſs is more or leſs full, and will make the liquor friſk and leap.

Materials for making of Glass. The materials whereof glaſs is made, we have already mentioned to be ſalt and ſand, or ſtones. The ſalt here uſed, is procured from a ſort of aſhes, brought from the Levant, called polverine, or rochetta; which aſhes are thoſe of a ſort of water-plant, called kali, cut down in ſummer, dried in the ſun, and burnt in heaps, either on the ground, or on iron-grates; the aſhes falling into a pit, grow into a hard maſs, or ſtone, fit for uſe. See Kali and Polverine.

To extract the ſalt, theſe aſhes, or polverine, are powdered and ſifted, then put into boiling water, and there kept till one third of the water be conſumed; the whole being ſtirred up, from time to time, that the aſhes may incorporate with the fluid, and all its ſalts be extracted: then the veſſel is filled up with new water, and boiled over again, till one half be conſumed; what remains is a ſort of lee, ſtrongly impregnated with ſalt. This lee, boiled over again in freſh coppers, thickens in about twenty-four hours, and ſhoots its ſalt; which is to be ladled out, as it ſhoots, into earthen pans, and thence into wooden fats to drain and dry. This done, it is groſsly pounded, and thus put in a ſort of oven, called calcar, to dry. It may be added, that there are other plants, beſides kali, which yield a ſalt fit for glaſs: ſuch are the alga or ſea-weed, the common way-thiſtle, bramble, hops, wormwood, woad, tobacco, fern, and the whole leguminous tribe, as peaſe, beans, &c. See the articles Ashes, Salt, Extraction, Alga, &c.

The ſand or ſtone, called by the artiſts Tarſo, is the ſecond ingredient in glaſs, and that which gives it the body and firmneſs. Theſe ſtones, Agricola obſerves, muſt be ſuch as will fuſe; and of theſe ſuch as are white and tranſparent are beſt; ſo that cryſtal challenges the precedency of all others. See the articles Crystal and Tarso.

At Venice they chiefly uſe a ſort of pebble, found in the river Teſino, reſembling white marble, and called cuogolo. Indeed Ant. Neri aſſures us, that all ſtones which will ſtrike fire with ſteel, are fit to vitrify: but Dr. Merret ſhews, that there are ſome exceptions from this rule. Flints are admirable; and when calcined, powdered, and ſearced, make a pure white cryſtalline metal: but the expence of preparing them m[illegible] the maſters of our glaſs-houſes ſpa[illegible] of their uſe. Where proper ſtones cannot be ſo conveniently had, ſand is uſed; which ſhould be white, and ſmall, and well waſhed, before it be applied: ſuch is uſually found in the mouths and ſides of rivers. Our glaſs-houſes are furniſhed with a fine ſand for cryſtal, from Maidſtone, the ſame with that uſed for ſand-boxes, and in ſcouring; and with a coarſer for green glaſs from Woolwich.

For cryſtal glaſs, to 200 ℔ of tarſo, pounded fine, they put 130 ℔ of ſalt of polverine; mix them together, and put them into the calcar, a ſort of reverberatory furnace, being firſt well heated. Here they remain baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate: when taken out, the mixture is called frit, or bollito. See Frit and Bollito.

It may be further obſerved, that glaſs might be made by immediately melting the materials without thus calcining, and making them frit: but the operation would be much more tedious.

A glaſs much harder than any prepared in the common way may be made by means of borax, in the following manner. Take four ounces of borax, and an ounce of fine white ſand, reduced

eed to powder, and melt them together in a large close crucible set in a wind furnace, keeping a strong fire for half an hour: then take out the crucible, and when cold, break it; and there will be found at the bottom a hard, pure glass, capable of cutting common glass almost like a diamond. This experiment duly varied, says Dr. Shaw, may lead to some considerable improvements in the art of glass, enamels, and artificial gems. It shews us an expeditious method of making glass without the use of fixed salts, which has generally been thought an essential ingredient in glass, and which is the ingredient that gives common glass its softness; and it is not yet known, whether calcined crystal, or other substances, being added to this salt, instead of sand, it might not make a glass approaching to the nature of a diamond. See the article GEM.

Kinds of GLASS. Of these materials we have many sorts of glass made, which may principally be distinguished according to their beauty; as the crystal flint glass, the crystal white glass, the green glass, and the bottle glass. Again these sorts are distinguished by their several uses; as plate or coach-glasses, looking-glasses, optic-glasses, &c. which are made of the first sort. The second sort includes crown-glass, toys, phials, drinking glasses, &c. The third sort is well known by its colour, and the second by its form.

Balas coloured GLASS is made thus: put into a pot crystal frit, thrice washed in water; tinge this with manganese prepared into a clear purple: to this add alumen cativum sifted fine in small quantities, and at several times; this will make the glass grow yellowish, and a little reddish, but not blackish, and always dissipates the manganese. The last time you add manganese, give no more of the alumen cativum, unless the colour be too full. Thus will the glass be exactly of the colour of the balas-ruby.

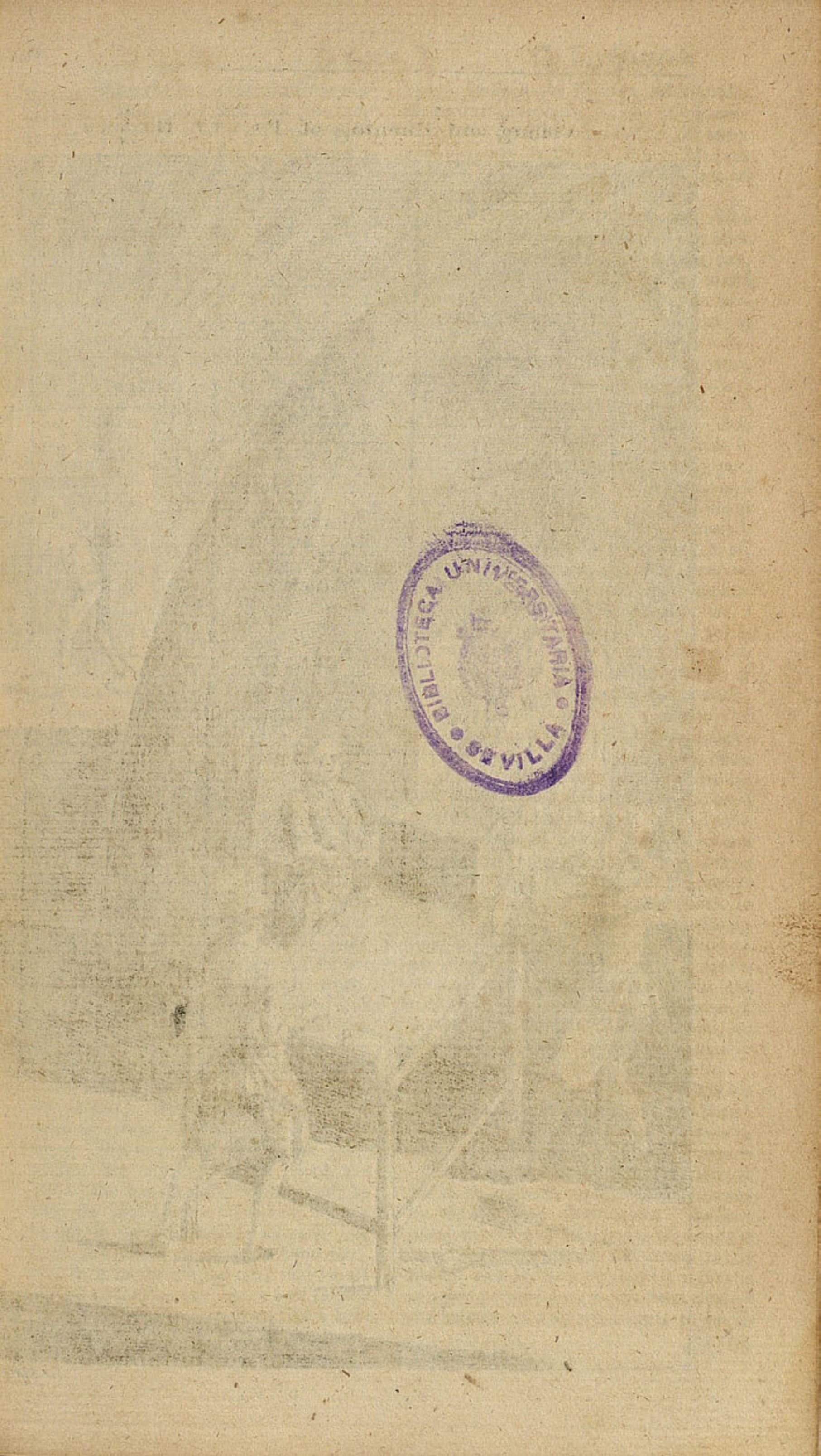
Red GLASS. A blood-red glass may be made in the following manner: put six pounds of glass of lead, and ten pounds of common glass into a pot glazed with white glass: when the whole is boiled and refined, add, by small quantities, and at small distances of time, copper calcined to a redness, as much as, on repeated proofs, is found sufficient: then add tartar in powder by small quantities at a time, till the glass is become as red as blood; and continue adding one or other of the ingredients till the colour is quite perfect.

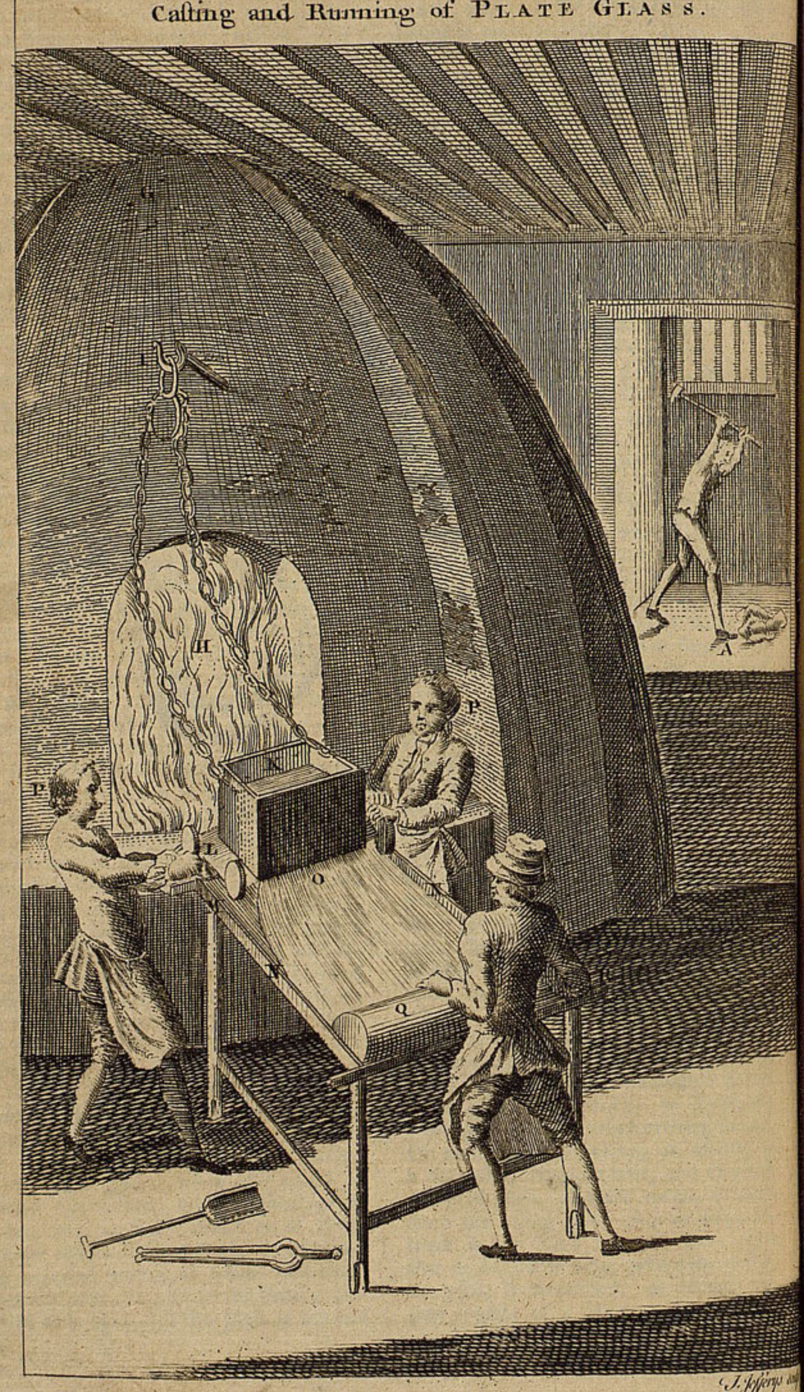
Yellow GLASS. It is a necessary remark in glass making, that the crystal-glass made with salt that has an admixture of tartar will never receive the true gold yellow, though it will all other colours: for yellow glass, therefore, a salt must be prepared from polverine, or pot-ashes alone to make the glass.

Furnaces for the making GLASS. In this manufacture, there are three sorts of furnaces, one called calcar, is for the frit, the second is for working the glass, the third serves to anneal the glass, and is called the leer. See FURNACE.

The calcar A, (plate CXIII, fig. 3.) resembles an oven ten feet long, seven broad, and two deep: the fuel, which in England is sea coal, is put into a trench on one side of the furnace; and the flame reverberating from the roof upon the frit, calcines it. The glass-furnace, or working furnace B, is round, of three yards diameter, and two high; or thus proportioned. It is divided into three parts, each of which is vaulted. The lower part C is properly called the crown, and is made in that form. Its use is to keep a brisk fire of coal and wood, which is never put out. The mouth of it is called the bocca. There are several holes in the arch of this crown, through which the flame passes into the second vault, or partition, and reverberates into the pots filled with the ingredients above-mentioned. Round the insides are eight or more pots placed, and piling pots on them. The number of pots is always double that of the boccos D, or mouths, or of the number of workmen, that each may have one pot refined to work out of, and another for metal to refine in, while he works out of the other. Through the working holes the metal is taken out of the pots, and the pots are put into the furnace, and these holes are stopped with moveable covers made of lute and brick, to screen the workmens eyes from the scorching flames. On each side of the bocca, or mouth, is a bocarella, or little hole, out of which coloured glass, or finer metal, is taken from the piling pot. Above this oven, there is the third oven or leer, about five or six yards long, where the vessels, or glass, is annealled, or cooled: this part consists of a tower, besides the leer

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Casting and Running of PLATE GLASS.

F, into which the flame afcends from the furnace. The tower has two mouths, through which the glaffes are put in with a fork, and fet on the floor or bottom: but they are drawn out on iron pans, called fraches, through the leer, to cool by degrees; fo that they are quite cold by the time they reach the mouth of the leer, which enters the farofel, or room where the glaffes are to be ftowed.

But the green glafs furnace is fquare; and at each angle it has an arch for annealing, or cooling the glaffes. The metal is wrought on two oppofite fides, and on the other two they have their colours, into which are made linnet holes, for the fire to come from the furnace to bake the frit, and to difcharge the fmoke. Fires are made in the arches to anneal the work, fo that the whole procefs is done in one furnace.

Thefe furnaces muft not be of brick, but of hard fandy ftones. In France, they build the outfide of brick, and the inner part to bear the fire is made of a fort of fuller's earth, or tobacco-pipe clay, of which earth they alfo make their melting-pots.

Mr. Blancourt obferves, that the worft and roughest work in this art, is the changing the pots, when they are worn out, or cracked. In this cafe the great working hole muft be uncovered; the faulty pot muft be taken out with iron hooks and forks, and a new one muft be fpeedily put in its place, thro' the flames, by the hands only. For this work, the man guards himfelf with a garment made of fkins, in the fhape of a pantaloon, that covers him all but his eyes, and is made as wet as poffible: the eyes are defended with a proper fort of glafs.

Inftruments for making of GLASS. The inftruments made ufe of in this work, may be reduced to thofe that follow. A blowing pipe, made of iron, about two feet and a half long, with a wooden handle. An iron rod to take up the glafs, after it is blown, and to cut off the former. Sciffars to cut the glafs when it comes off from the firft hollow iron. Shears to cut and fhape great glaffes, *&c.* an iron ladle, with the end of the handle cafed with wood, to take the metal out of the refining pot to put it into the workmens pots. A fmall iron laddle, cafed in the fame manner, to fkim the alkalic falt, that fwims at top. Shovels, one like a peel to take up the great glaffes; another, like a fire-fhovel, to feed the furnace with coals. A hooked iron fork, to ftir the matter in the pots. An iron rake for the fame purpofe, and to ftir the frit. An iron fork, to change or pull the pots out of the furnace, *&c.*

Working or blowing round GLASS. The tools thus provided, the workman dips his blowing pipe into the melting-pot, and by turning it about, the metal fticks to the iron more firmly than turpentine. This he repeats four times, at each time rolling the end of his inftrument, with the hot metal thereon, on a piece of iron G, over which is a veffel of water which helps to cool, and fo to confolidate, and to difpofe that matter to bind more firmly with what is to be taken next out of the melting-pot. But after he has dipt a fourth time, and the workman perceives there is metal enough on the pipe, he claps his mouth immediately to the other end of it H, and blows gently through the iron tube, till the metal lengthens like a bladder about a foot. Then he rolls it on a marble ftone I, a little while, to polifh it, and blows a fecond time, by which he brings it to the fhape of a globe of about eighteen or twenty inches diameter. Every time he blows into the pipe, he removes it quickly to his cheek, otherwife he would be in danger, by often blowing, of drawing the flame into his mouth; and this globe may be flattened by returning it to the fire, and brought into any form by ftamp-irons, which are always ready. When the glafs is thus blown, it is cut off at the collet, or neck, which is the narrow part that ftuck to the iron. The method of performing this, is as follows: the pipe is refted on an iron bar, clofe by the collet: then a drop of cold water being laid on the collet, it will crack about a quarter of an inch, which with a flight blow, or cut of the fhears K, will immediately feparate the collet.

After this is done, the operator dips the iron rod into the melting-pot, by which he extracts as much metal as ferves to attract the glafs he has made, to which he now fixes this rod at the bottom of his work, oppofite to the opening made by the breaking of the collet. In this pofition, the glafs is carried to the great bocca, or mouth of the oven, to be heated and fcalded, by which means it is again put into fuch a foft ftate, that by the help of an iron inftrument, it can be pierced,

pierced, opened, and widened without breaking. But the vessel is not finished, till it is returned to the great bocca; where it being again heated thoroughly, and turned quickly about with a circular motion, it will open to any size, by the means of the heat and motion. And by this means we come to learn the cause why the edge of all bowls and glasses, *&c.* are thicker than the other parts of the same glasses, because in the turning it about in the heat, the edge thickens; and the glass being as it were doubled in that part, the circumference appears like a selvage.

If there remains any superfluities, they are cut off with the shears L; for till the glass is cool, it remains in a soft, flexible state. It is therefore taken from the bocca, and carried to an earthen bench, covered with brands, which are coals extinguished, keeping it turning; because that motion prevents any settling, and preserves an evenness in the face of the glass, where, as it cools, it comes to its consistency; being first cleared from the iron rod by a slight stroke by the hand of the workman.

If the vessel conceived in the workman's mind, and whose body is already made, requires a foot, or a handle, or any other member or decoration, he makes them separate; and now assays to join them with the help of hot metal, which he takes out of the pots with his iron rod: but the glass is not brought to its true hardness, till it has passed the leer, or annealing oven, described before.

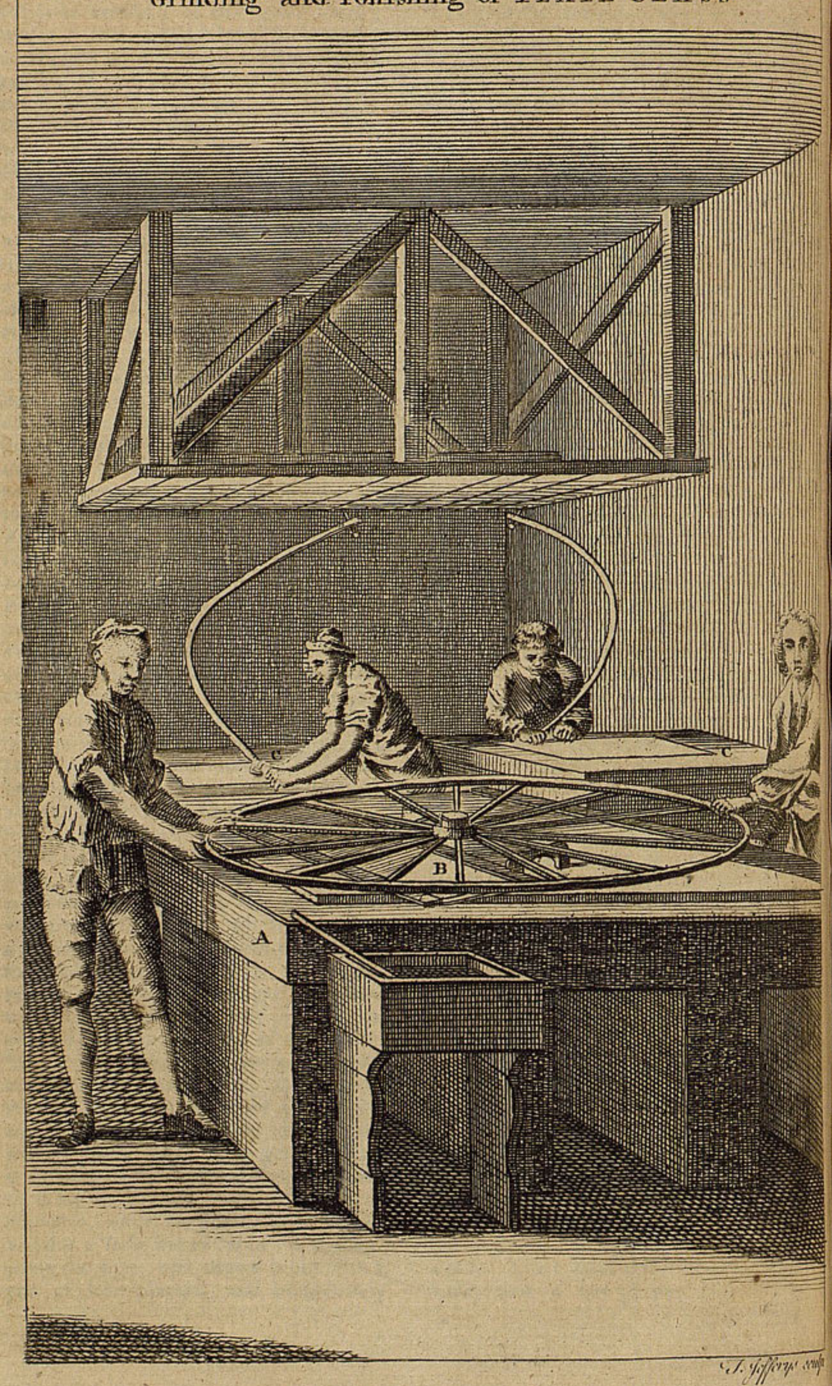
Working, or blowing, of window or table GLASS. The method of working round glass, or vessels of any sort, is in every particular applicable to the working of window or table-glass, till the blowing iron has been dipt the fourth time. But then instead of rounding it, the workman blows, and so manages the metal upon the iron-plate, that it extends two or three feet in the form of a cylinder. This cylinder is put again to the fire, and blown a second time, and is thus repeated till it is extended to the dimensions required, the side to which the pipe is fixed diminishing gradually till it ends in a pyramidical form; so that to bring both ends nearly to the same diameter, while the glass is thus flexible, he adds a little hot metal to the end opposite the pipe, and draws it out with a pair of iron pincers, and immediately cuts off the same end with the help of a little cold water, as before.

The cylinder being now open at one end is carried back to the bocca, and there, by the help of cold water, it is cut about eight or ten inches from the iron pipe, or rod; and the whole length at another place, by which also it is cut off from the iron rod. Then it is heated gradually on an earthen table, by which it opens in length, while the workman, with an iron tool, alternately lowers and raises the two halves of the cylinder, which at last will open like a sheet of paper, and fall into the same flat form in which it serves for use; in which it is preserved by heating it over again, cooling it on a table of copper, and hardening it twenty-four hours in the annealing furnace, to which it is carried upon forks. In this furnace, an hundred tables of glass may lie at a time, without injury to each other, by separating them into tens, with an iron shiver between, which diminishes the weight by dividing it, and keeps the tables flat and even.

This was the method formerly made use of for blowing plate-glass, looking-glasses, *&c.* but the workmen, by this method, could never exceed fifty inches in length, and a proportional breadth, because what were larger were always found to warp, which prevented them from reflecting the objects regularly, and wanted substance to bear the necessary grinding. These imperfections have been remedied by an invention of the Sieur Abraham Thevart, in France, about the year 1688, of casting or running large plates of glass in the following manner.

*Casting, or running of large looking-*GLASS *plates.* The furnace G, (plate CXIV.) is of a very large dimension, environed with several ovens, or annealing furnaces, called carquasses, besides others for making of frit, and calcining old pieces of glass. This furnace, before it is fit to run glass, costs 3500 l. It seldom lasts above three years, and even in that time it must be refitted every six months. It takes six months to rebuild it; and three months to refit it. The melting-pots are as big as large hogsheads, and contain about 2000 weight of metal. If one of them bursts in the furnace, the loss of the matter and time amounts to 250 l. The heat of this furnace is so intense, that a bar of iron laid at the mouth


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Grinding and Pollishing of PLATE GLASS
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C
B
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J. Jefferys sculp

mouth thereof becomes red hot in less than half a minute. The materials in these pots are the same as described before; and A is the man breaking the frit for that purpose. When the furnace is red hot, these materials are put in at three different times, because that helps the fusion; and in twenty-four hours they are vitrified, refined, settled, and fit for casting. H is the bocca, or mouth of the furnace, K is the cistern that conveys the liquid glass it receives out of the melting-pots in the furnace to the casting table. These cisterns are filled in the furnace, and remain therein six hours after they are filled; and then are hooked out by the means of a large iron chain, guided by a pully marked I, and placed upon a carriage with four wheels marked L, by two men P, P. This carriage has no middle piece; so that when it has brought the cistern to the casting table M, they slip off the bottom of the cistern, and out rushes a torrent of flaming matter O, upon the table: this matter is confined to certain dimensions by the iron rulers N, N, N, which are moveable, retain the fluid matter, and determine the width of the glass; while a man R, with the roller Q resting on the edge of the iron rulers, reduceth it as it cools to an equal thickness, which is done in the space of a minute. This table is supported on a wooden frame, with trustles for the convenience of moving to the annealing furnace; into which, strewed with sand the new plate is shoved, where it will harden in about ten days. After this the glass needs only be ground, polished, and foliated for use.

Grinding and polishing of plate GLASS. Glass is made transparent by fire, but it receives its lustre by the skill and labour of the grinder and polisher, the former of whom takes its rough out of the hands of the maker.

In order to grind plate-glass, they lay it horizontally upon a flat stone table, (pl. CXV.) made of a very fine grained free-stone; and for its greater security they plaster it down with lime, or stucco: for otherwise the force of the workmen, or the motion of the wheel, with which they grind it, would move it about.

This stone-table is supported by a strong frame, A, made of wood, with a ledge quite round its edges, rising about two inches higher than the glass. Upon this glass to be ground, is laid another rough glass not above half so big, and so loose as to slide upon it; but cemented to a wooden plank, to guard it from the injury it must otherwise receive from the scraping of the wheel, to which this plank is fastened; and from the weights laid upon it, to promote the grinding, or friture, of the glasses. The whole is covered with a wheel, B, made of hard light wood, about six inches in diameter; by pulling of which backwards and forwards alternately, and sometimes turning it round, the workmen who always stand opposite to each other, produce a constant attrition between the two glasses, and bring them to what degree of smoothness they please, by first pouring in water and coarse sand: after that a finer sort of sand as the work advanceth, till at last they must pour in the powder of smalt. As the upper or incumbent glass polishes, and grows smoother, it must be taken away, and another from time to time put in its place.

This engine is called a mill by the artists, and is used only in the largest size glasses; for in the grinding of the lesser glasses, they are content to work without a wheel, and to have only four wooden handles fastened to the four corners of the stone which loads the upper plank, by which they work it about.

When the grinder has done his part, who finds it very difficult to bring the glass to an exact plainness, it is turned over to the care of the polisher, who with the fine powder of tripoli-stone, or emery, brings it to a perfect evenness and lustre. The instrument made use of in this branch, is a board, *c*, *c*, furnished with a felt, and a small roller, which the workman moves by means of a double handle at both ends. The artist in working this roller, is assisted with a wooden hoop, or spring, to the end of which it is fixed: for the spring, by constantly bringing the roller back to the same points, facilitates the action of the workman's arm.

Grinding and polishing of optic GLASSES. See GRINDING and POLISHING.

Foliating of GLASS. See FOLIATING.

Axungia of GLASS. See AXUNGIA.

Painting in GLASS. The antient manner of painting in glass was very simple and consequently very easy; it consisted in the mere arrangement of pieces of glass of different colours in some sort of symmetry, and constituted what is now called mosaic work. See the article MOSAIC. In process of time they came to attempt more

more regular deſigns, and alſo to repreſent figures heightened with all their ſhades: yet they proceeded no farther than the contours of the figures in black with water colours, and hatching the diaperies after the ſame manner on glaſſes of the colour of the object they deſigned to paint. For the carnation they uſed glaſs of a bright red colour; and upon this they drew the principal lineaments of the face, *&c.* with black.

But in time, the taſte for this ſort of painting improving conſiderably, and the art being found applicable to the adorning of churches, baſilics, *&c.* they found out means of incorporating the colours in the glaſs itſelf, by heating them in the fire to a proper degree; having firſt laid on the colours. The colours uſed in painting or ſtaining of glaſs are very different from thoſe uſed in painting either in water or oil colours. See the article Colour.

For black, Take ſcales of iron, one ounce; ſcales of copper, one ounce; jet, half an ounce; reduce them to powder, and mix them. For blue, Take powder of blue, one pound; ſal nitre, half a pound; mix them and grind them well together. For carnation, Take red chalk, eight ounces; iron ſcales and litharge of ſilver, of each two ounces; gum arabic, half an ounce; diſſolve in water; grind all together for half an hour as ſtiff as you can; then put it in a glaſs, and ſtir it well, and let it ſtand to ſettle fourteen days. For green, Take red lead, one pound; ſcales of copper, one pound; and flint, five pounds; divide them into three parts; and add to them as much ſal nitre; put them into a crucible, and melt them with a ſtrong fire; and when it is cold, powder it, and grind it on a porphyry. For gold colour, Take ſilver, an ounce; antimony, half an ounce; melt them in a crucible; then pound the maſs to powder; and grind it on a copper plate; add to it yellow oker, or brick duſt calcined again, fifteen ounces; and grind them well together with water. For purple, Take minium, one pound; brown ſtone, one pound; white flint, five pounds; divide them into three parts, and add to them as much ſal nitre as one of theſe parts; calcine, melt, and grind it as you did the green. For red, Take jet, four ounces; litharge of ſilver, two ounces; red chalk, one ounce; powder them fine; and mix them. For white, Take jet two parts; white flint, ground on a glaſs very fine, one part; mix them. For yellow, Take ſpaniſh brown, ten parts; leaf ſilver, one part; antimony, half a part; put all into a crucible, and calcine them well.

In the windows of antient churches, *&c.* there are to be ſeen the moſt beautiful and vivid colours imaginable, which far exceed any of thoſe uſed by the moderns, not ſo much becauſe the ſecret of making thoſe colours is intirely loſt, as that the moderns will not go to the charge of them, nor be at the neceſſary pains, by reaſon that this ſort of painting is not now ſo much in eſteem as formerly. Thoſe beautiful works which were made in the glaſs houſes were of two kinds.

In ſome, the colour was diffuſed through the whole ſubſtance of the glaſs. In others, which were the more common, the colour was only on one ſide, ſcarce penetrating within the ſubſtance above one third of a line; though this was more or leſs according to the nature of the colour; the yellow being always found to enter the deepeſt. Theſe laſt, though not ſo ſtrong and beautiful as the former, were of more advantage to the workmen, by reaſon that on the ſame glaſs, tho' already coloured, they could ſhew other kind of colours where there was occaſion to embroider draperies, enrich them with foliages, or repreſent other ornaments of gold, ſilver, *&c.*

In order to this, they made uſe of emery, grinding or wearing down the ſurface of the glaſs, till ſuch time as they were got through the colour to the clear glaſs. This done, they applied the proper colours on the other ſide of the glaſs. By this means, the new colours were hindered from running and mixing with the former, when they expoſed the glaſſes to the fire, as will appear hereafter.

When indeed the ornaments were to appear white, the glaſs was only bared of its colour with emery, without tinging the place with any colour at all; and this was the manner by which they wrought their lights, and heightenings, on all kinds of colour.

The firſt thing to be done, in order to paint, or ſtain glaſs, in the modern way, is to deſign, and even colour the whole ſubject on paper. Then they chooſe ſuch pieces of glaſs as are clear, even, and ſmooth, and proper to receive the ſeveral parts, and proceed to diſtribute the deſign itſelf, or papers it is drawn on, into pieces

p' , suitable to those of the glass; always taking care that the glasses may join in the contours of the figures, and the folds of the draperies; that the carnations, and other finer parts, may not be impaired by the lead with which the pieces are to be joined together. The distribution being made, they mark all the glasses as well as papers, that they may be known again: which done, applying every part of the design upon the glass intended for it, they copy, or transfer, the design upon this glass with the black colour diluted in gum water, by tracing and following all the lines and strokes as they appear through the glass with the point of a pencil.

When these strokes are well dried, which will happen in about two days, the work being only in black and white, they give a slight wash over with urine, gum arabic, and a little black; and repeat it several times, according as the shades are desired to be heightened, with this precaution, never to apply a new wash till the former is sufficiently dried.

This done, the lights and risings are given by rubbing off the colour in the respective places with a wooden point, or the handle of the pencil.

As to the other colours above-mentioned, they are used with gum-water, much as in painting in miniature; taking care to apply them lightly for fear of effacing the out-lines of the design; or even, for the greater security, to apply them on the other side; especially yellow, which is very pernicious to the other colours, by blending therewith. And here too, as in pieces of black and white, particular regard must always be had not to lay colour on colour, or lay on a new lay, till such time as the former are well dried.

It may be added, that the yellow is the only colour that penetrates through the glass, and incorporates therewith by the fire; the rest, and particularly the blue, which is very difficult to use, remaining on the surface, or at least entering very little. When the painting of all the pieces is finished, they are carried to the furnace, or oven, to anneal, or bake the colours.

The furnace here used is small, built of brick, from eighteen to thirty inches square; at six inches from the bottom is an aperture to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three square bars of iron, which traverse the furnace, and divide it into two parts. Two inches above this partition, is another little aperture, through which they take out pieces to examine how the coction goes forward. On the grate is placed a square earthen pan, six or seven inches deep; and five or six inches less every way than the perimeter of the furnace. On the one side hereof is a little aperture, through which to make trials, placed directly opposite to that of the furnaces destined for the same end. In this pan are the pieces of glass to be placed, in the following manner. First, the bottom of the pan is covered with three strata, or layers, of quick lime pulverized; those strata being separated by two others of old broken glass, the design whereof is to secure the painted glass from the too intense heat of the fire. This done, the glasses are laid horizontally on the last or uppermost layer of lime.

The first row of glass they cover over with a layer of the same powder, an inch deep; and over this, they lay another range of glasses, and thus alternately till the pan is quite full; taking care that the whole heap always end with a layer of the lime powder.

The pan being thus prepared, they cover up the furnace with tiles, on a square table of earthen ware, closely luted all round; only leaving five little apertures, one at each corner, and another in the middle, to serve as chimnies. Things thus disposed, there remains nothing but to give the fire to the work. The fire for the first two hours must be very moderate, and must be increased in proportion as the coction advances, for the space of ten or twelve hours; in which time it is usually compleated. At last the fire, which at first was charcoal, is to be of dry wood, so that the flame covers the whole pan, and even issues out at the chimnies. During the last hours, they make essays, from time to time, by taking out pieces laid for the purpose through the little aperture of the furnace, and pan, to see whether the yellow be perfect, and the other colours in good order. When the annealing is thought sufficient, they proceed with great haste to extinguish the fire, which otherwise would soon burn the colours, and break the glasses.

GLASS *of lead*, a glass made with the addition of a large quantity of lead; of great use in the art of making counterfeit gems. See the article GEM.

The method of making it is this. Put a large quantity of lead into a potter's kiln; and keep it in a state of fusion,

with a moderate fire, till it is calcined to a very grey, loose powder: then spread it on the kiln, and give it a greater heat, continually stirring it, to keep it from gathering into lumps: continue this several hours, till the powder become of a fair yellow: then take it out, and sift it fine: this is called calcined lead. Take of this calcined lead fifteen pounds, and crystalline or other frit, twelve pounds; mix these as well as possible together; put them into a pot, and set them in the furnace for ten hours; then cast the whole, which will now be perfectly melted, into water; separate the loose lead from it; and return the metal into the pot; and after standing in fusion twelve hours more, it will be fit to work. This glass is capable of all the colours of the gems in great perfection.

Glass *porcelain*, the name given by many to a modern invention of imitating the china-ware with glass. See Porcelain. The method of making it, as given by Mr. Reaumur, who was the first that carried the attempt to any degree of perfection, is as follows.

The glass vessels to be converted into porcelain, are to be put into large vessels, such as the common fine earthen dishes are baked in; or, into sufficiently large crucibles: the vessels are to be filled with a mixture of fine white sand, and of fine gypsum; or plaster-stone, burnt into what is called plaster of paris; and all the interstices are to be filled up with the same powder, so that the glass vessel may no where touch either one another, or the sides of the vessels they are baked in.

The vessel is to be then covered down, and luted, and the fire does the rest of the work; for this is only to be put into a common potter's furnace, and when it has stood there the usual time of baking the other vessels, it is to be taken out, and the whole contents will be found no longer glass, but converted into a white opake substance, which is a very elegant porcelain, and has almost the properties of that of china.

Glass *of chalcedony*, a mixture of several ingredients with the common mixture of glass, which will make it represent the semi-opake gems, the jaspers, agates, chalcedonies, *&c.* See Gem.

Glass *of antimony* may be deprived of its emetic quality by digesting it with pure spirit of vinegar till the menstruum be highly tinged. See the article Antimony.

Mr. Boyle says, that if you abstract this liquor, and digest good rectified spirit of wine on the remaining powder, an excellent tincture against several diseases may be obtained. See Tincture.

Duties on Glass: Balm-glasses, on importation, pay per gross, 2 s. $5\frac{98\frac{1}{8}}{100}$d; and draw back on exportation, 2 s. $3\frac{84\frac{3}{8}}{100}$d. Burning glasses, on importation, pay, per dozen, $11\frac{99\frac{1}{4}}{100}$d. and draw back on exportation, $11\frac{13\frac{3}{4}}{100}$d. Perspective glasses, the piece not exceeding three feet in length, pay 8 s. $1\frac{5}{100}$d. on importation; and draw back 7 s. $4\frac{50}{100}$d. on exportation. Perspective-glasses exceeding three feet in length, pay 16 s. $2\frac{10}{100}$d. on importation; and draw back 14 s. 9 d. on exportation. Small perspective-glasses the dozen, pay on importation 8s. $1\frac{5}{100}$d. and draw back on exportation, 7s. $4\frac{50}{100}$d. Vials the hundred, pay on importation, 4 s. $11\frac{96\frac{1}{2}}{100}$d. and draw back on exportation, 4 s. $7\frac{68\frac{3}{4}}{100}$d. Water glasses the dozen pay on importation, 3 s. $11\frac{97}{100}$d. and draw back on exportation, 3 s. $8\frac{55}{100}$d. Broken glass the 112 ℔. pays on importation, 1 s. $\frac{13\frac{1}{8}}{100}$d. and draws back on exportation, $11\frac{6\frac{1}{4}}{100}$d. Coarse drinking-glasses, the dozen pay on importation $11\frac{99\frac{1}{4}}{100}$d. and draw back on exportation, $11\frac{13\frac{3}{4}}{100}$d. Flanders drinking glasses per hundred, pay on importation, 8 s. $3\frac{93\frac{1}{4}}{100}$d. and draw back on exportation, 7s. $8\frac{81\frac{1}{4}}{100}$d. French drinking-glasses per hundred, pay on importation, 10 s. $1\frac{83\frac{3}{4}}{100}$d. and draw back on exportation, 6 s. $\frac{56\frac{1}{4}}{100}$d. Venice drinking-glasses the dozen pay on importation, 5 s. $11\frac{95\frac{1}{2}}{100}$d. and draw back on expor-

exportation, 5 s. $6\frac{82\frac{1}{2}}{100}$d. Flanders coarſe hour-glaſſes, the groſs pay on importation, 19 s. $11\frac{55}{100}$d. and draw back on exportation, 18 s. $6\frac{75}{100}$d. Flanders fine hour-glaſſes pay per dozen, on importation, 6 s. $7\frac{95}{100}$d. and draw back on exportation, 6 s. $2\frac{25}{100}$d. Venice hour-glaſſes, the dozen, pay, on importation, 19 s. $11\frac{85}{100}$d. and draw back on exportation, 18 s. $6\frac{75}{100}$d. Looking-glaſſes of cryſtal, ſmall, n° 6. pay per dozen on importation, 9 s. $11\frac{92\frac{1}{2}}{100}$d. and draw back on exportation, 9 s. $3\frac{37\frac{1}{2}}{100}$d. Middle ſort, the dozen pay on importation, 19 s. $11\frac{85}{100}$d. and draw back on exportation, 18 s. $6\frac{75}{100}$d. Looking glaſſes of cryſtal, the dozen n° 11, 12. pay on importation, 14 l. 19 s. $9\frac{75}{100}$d. and draw back on exportation, 13 l. 18 s. $5\frac{25}{100}$d.

GLASTONBURY, a market-town of Somerſetſhire, five miles ſouth of Wells.

Glastonbury-thorn, in botany, a ſpecies of meſpilus, or medlar.

GLATZ, the capital of a county of the ſame name in Bohemia, 100 miles eaſt of Prague: eaſt long. 16° 8′, north lat. 50° 25′.

GLAUBER's salt, a cathartic or purging ſalt, thus made. Take of the cake that remains after the diſtillation of Glauber's ſpirit of ſea ſalt; diſſolve it in hot water, and filtre the ſolution through paper. Then reduce the ſalt into cryſtals. It is given in doſes, from half an ounce to an ounce. See Salt.

Glauber's ſalt, called by ſome ſal mirabile, is nearly allied to Epſom ſalt. See Epsom.

GLAUCION, in ornithology, a very elegant freſh water fowl, of the anas or duck-kind, nearly of the ſize of the common wild duck: its eyes are bright and very piercing in their aſpect, and the iris of a fine gold yellow. See Anas.

GLAUCOMA, in medicine, the change of the cryſtalline humour of the eye into an azure-colour, proceeding from its dryneſs and condenſation, as ſome affirm; but Heiſter rather thinks, it ariſes from an opacity of the vitreous humour, which becomes of a whitiſh green colour: for in a ſuffuſion, an opake body is placed behind the pupil, or is next to the uveous part. Sennertus ſays, it may be known from a very remarkable whiteneſs appearing in the eye, and lying deep behind the pupil; which makes every thing appear as if ſeen through a ſmoak or cloud. It is ſaid to be incurable when inveterate; but that the medicines preſcribed for a gutta ſerena, are beſt alſo in this caſe. See the article Gutta serena.

GLAUCUS, in ichthyology, the name of two diſtinct fiſhes, the one a ſpecies of ſcomber, with the ſecond ray of the hinder back-fin longeſt; and the other a ſpecies of ſqualus, with a triangular cavity in the hinder part of the back, but without any foramina beſide the eyes. This laſt is the blue ſhark.

GLAUX, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle, campanulated, erect, and permanent petal, divided into five roundiſh ſegments: the fruit is a large, globoſe, but acuminated and unilocular capſule, formed of five valves, and containing five roundiſh ſeeds.

Glaux is alſo the name by which ſome call the aſtragalus, or milk-vetch. See the article Astragalus.

GLAZIER, an artificer who works in glaſs. See the article Glass.

The principal part of a glazier's buſineſs conſiſts in fitting panes and plates of glaſs to the ſaſhes and window-frames of houſes, pictures, &c. and in cleaning the ſame.

GLAZING, the poliſhing or cruſting over earthen ware, by running melted lead or litharge over it.

The common ware is glazed with a compoſition of 50 lb. clean ſand, 70 lb. lead-aſhes, 30 lb. wood-aſhes, and 12 lb. ſalt, all melted into a cake. With this mixture they glaze it over, and then ſet it in an earthen glazing plan; taking care that the veſſels do not touch one another. As ſeveral colours are uſed for this purpoſe, we ſhall give the following receipts, from Smith's Laboratory. 1. For a black, take lead-aſhes, 18 parts; iron filings, 3; copper-aſhes, 3; and zaffer, 2: this, when melted, will make a brown black; and if you would have it blacker, put ſome more zaffer to it. 2. For blue, take lead-aſhes, 1 lb. clear ſand or pebble, 2 lb. ſalt, 2 lb. white calcined tartar, 1 lb. Venice or other glaſs, 16 lb. and zaffer, half a pound: mix them well together; and after melting quench them in water, and then melt them again; which operation is to be repeated ſeveral times; and if you would have it fine and good, it will be proper to put the mixture into a glaſs furnace for a day or two. 3. A brown glazing may be given with

with a mixture of lead-glafs, 12 parts, and common glafs and manganefe, of each one part. 4. A citron-yellow may be made of 6 parts of red-lead, 7 parts of fine red brick-duft, and 2 parts of antimony, all melted together. 5. A flefh-colour, with 12 parts of lead afhes, and 1 of white glafs. 6. For a green-colour, take 8 parts of litharge, 8 parts of Venice glafs, 4 parts of brafs duft, and melt them together for ufe; or melt together 2 parts yellow-glafs, with as much copper-duft. 7. For a gold yellow, take of antimony, red lead, and fand, an equal quantity, and melt them into a cake. 8. For a fine purple brown, take lead-afhes, 15 parts; clear fand, 18; manganefe, 1; white-glafs, 15 meafures; and one of zaffer. 9. For a fine red, take antimony, 2 lb. litharge, 3 lb. ruft of iron calcined, 1 lb. and grind them to a fine powder. 10. For a fine white glazing, take 2 lb. of lead, 1 lb. of tin, and calcine them to afhes; of which take 2 parts; of calcined flint or pebble, 1 part; of falt, 1 part; and mixing them well together, melt them into a cake. At Rotterdam, they make a fine fhining white glazing, by melting together 2 lb. clean tin-afhes, 10 lb. lead-afhes, 2 lb. fine Venice-glafs, and ½ lb. tartar. 11. A yellow glazing is made of 4 ounces of red-lead, and 2 ounces of antimony, melted together. 12. For a fine yellow, take red lead, 3 pints; antimony and tin, of each 1 lb. then melting them into a cake, grind it fine; and repeating this feveral times, you will have a good yellow.

GLEAD, or GLADE, in ornithology, a name ufed in fome parts of the kingdom for the milvus, or kite. See MILVUS.

GLEAM, among falconers, is faid of a hawk, when fhe cafts or throws up filth from her gorge.

GLEBE, among miners, fignifies a piece of earth, wherein is contained fome mineral ore. See the article ORE.

GLEBE, in law, the land belonging to a parifh church, befides the tithes.

When a parfon or vicar has caufed any of his glebe-lands to be manured and fown, at his own charge, with corn or grain, he may by will devife all the profits and corn growing upon the faid glebe; and in cafe he dies without difpofing thereof, his executors fhall have the fame.

GLECHOMA, in botany, the name by which Linnæus calls ground-ivy, a plant belonging to the didynamia-gymnofpermia clafs, the flower of which is monopetalous and ringent: there is no pericarpium; the feeds, which are oval and four in number, being contained in the cup. The flowers are moderately large, and of a beautiful blue. See GROUND IVY.

GLEDITSIA, in botany, a genus of the dioecia-hexandria clafs of plants, the flower of which confifts of four petals, and is arranged in the form of an amentum: the fruit is a very large pod, feparated by partitions into diftinct cells, which are full of a pulpy matter; the feeds are folitary, roundifh, hard and fhining.

GLEET, in medicine, the flux of a thin limpid humour from the urethra.

Many imagine that the prodigious increafe of certain gleets at particular times, lafting only for two or three days, and then fuddenly abating to their wonted quantity, is inconfiftent with a purulent difcharge; and, therefore, conclude a gleet to be nothing but a præternatural excretion from the relaxed veffels of the urethra. For the cure of venereal gleets, the ufe of a bougie is recommended, as are aftringent injections, beginning with weak ones, and gradually increafing their ftrength. Aftruc recommends milk, drank morning and evening for fome time; then mineral waters, whether chalybeate or vitriolic, for fifteen or twenty days; and afterwards balfamics, to deterge and cicatrize the ulcers concealed in the urethra; and, laft of all, aftringents, to dry up the ulcers, and recover the tone of the parts; fuch as infufions of the leaves of mint, horehound, agrimony, plantain, fhepherd's purfe, fage, &c. Turner recommends the cold bath, Spaw, Pyrmont, and Briftol waters. Heifter, for an injection, recommends lime-water, with a little fugar of lead, or lime-water, with a little camphorated fpirit of wine. Turner, when there is any fufpicion of a remaining virulence, adds calomel to the lime-water.

GLENE, γλήνη, in anatomy, a fhallow cavity of any bone, which receives another bone in articulation. It alfo fignifies the cavity or focket of the eye.

GLENOIDES, the name of two cavities, or fmall depreffions, in the inferior part of the firft vertebra of the neck.

GLESUM, a name antiently given to amber. See the article AMBER.

GLINUS, in botany, a genus of the dodecandria-trigynia clafs of plants, the calyx of which confifts of five oval, concave, permanent leaves: there is no corolla; the

the fruit is an oval, five cornered capſule, compoſed of five valves, and containing five cells: the ſeeds are numerous and roundiſh.

GLIS, in zoology, a name given by ſome to the common rat, as alſo to the rell and dor-mouſe. See Mus and Rat.

The fleſh of the rell-mouſe is recommended for a bulimy; and its fat, rubbed on the feet, is ſaid to procure ſleep.

GLISCHROMICTHES, in natural hiſtory, the name by which Dr. Hill calls the tougher and more viſcid loams. See the article Loams.

Of this genus there are ſeveral ſpecies. 1. The greyiſh-white gliſchromicthes, of a denſe and compact texture: this raiſes a great effervelcence with aqua-fortis, and makes a very valuable brick; but requires ſo much working, that it is ſeldom uſed alone. 2. The pale yellow gliſchromicthes: this raiſes no efferveſcence with aqua-fortis, but makes a fine red brick. 3. The yellowiſh-brown gliſchromicthes, which raiſes no efferveſcence with aqua fortis, and makes a very good brick, but is ſeldom uſed alone. 4. The reddiſh-brown gliſchromicthes. It raiſes no efferveſcence with aqua-fortis, and though uſed in brick-making, makes but a ſoft and coarſe kind.

GLISTER, in ſurgery, the ſame with clyſter. See the article Clyster.

GLOBE, in geometry, the ſame with ſphere. See the article Sphere.

Globe, in practical mathematics, an artificial ſpherical body, on the convex ſurface of which are repreſented the countries, ſeas, &c. of our earth; or the face of the heavens, the circles of the ſphere, &c. That with the parts of the earth delineated upon its ſurface, is called the terreſtrial globe; and that with the conſtellations, &c. the celeſtial globe. Theſe globes are placed in frames, with other appurtenances, as repreſented in plate CXVI. fig. 1. and 2. Their principal uſe, beſides ſerving as maps to diſtinguiſh the outward parts of the earth, and the ſituation of the fixed ſtars, is to illuſtrate and explain the phænomena ariſing from the diurnal motion of the earth. See the article Diurnal.

Conſtruction and deſcription of the Globes. The globes commonly uſed are made of paſteboard, or paper, fitted to a ſpherical mold. After this covering is formed to the artificer's mind, it is divided, by inciſion, along the middle, and taken off the mold in the form of two caps, or hemiſpheres. Theſe are next fitted upon a wooden axis, with iron-poles; and, being firmly ſewed together, are afterwards paſted over with a compoſition made of whiting and glue, till the globe become perfectly ſpherical and ſmooth. This done, a map of the earth, or of the heavens, is projected in ſeveral gores, which being paſted on, the whole is coloured and varniſhed. Thus finiſhed, the globe is hung in a brazen meridian, moveable within a wooden horizon, and fitted with a horary circle, quadrant of altitude, &c.

There are ten principal circles repreſented upon globes, *viz.* ſix greater and four leſſer ones. The greater circles are the horizon, meridian, equinoctial, as it is called on the celeſtial, and equator on the terreſtrial globe, the ecliptic drawn along the middle of the zodiac, and the two colures. See the articles Horizon, Meridian, &c.

The leſſer circles, of principal uſe, are the two tropics and two polar circles. See Circle, Tropic, and Polar.

Of theſe circles ſome are fixed, and always obtain the ſame poſition; others moveable, according to the poſition of the obſerver. The fixed circles are the equator and ecliptic, with their parallels and ſecondaries; which are uſually delineated upon the ſurface of the globes. The moveable circles are the horizon, with its parallels and ſecondaries.

The horizon is that great and broad wooden circle ſurrounding the globe, and dividing it into two equal parts, called the upper and lower hemiſpheres. It has two notches, to let the brazen meridian ſlip up and down, according to the different heights of the pole. On the flat ſide of this circle are deſcribed the twelve ſigns, the months of the year, the points of the compaſs, &c. The brazen meridian is an annulus or ring of braſs, divided into degrees, as repreſented in the figure. It divides the globe into two equal parts, called the eaſtern and weſtern hemiſpheres. The quadrant of altitude is a thin pliable plate of braſs, anſwering exactly to a quadrant of the meridian. It is divided into 90°, and has a notch, nut and ſcrew, to fix to the brazen meridian in the zenith of any place; where it turns round a pivot, and ſupplies the room of vertical circles. The hour-circle is a flat ring of braſs, divided into twenty-four equal parts, or hour-diſtances; and on the pole of the globe is

is fixed an index, that turns round with the globe, and points out the hours upon the hour-circle. Laftly, there is generally added a compafs and needle upon the pediment of the frame.

The furface of the celeftial globe may be efteemed a juft reprefentation of the concave expanfe of the heavens, notwithftanding its convexity; for it is eafy to conceive the eye placed in the center of the globe, and viewing the ftars on its furface; fuppofing it made of glafs, as fome globes are: alfo that if holes were made in the center of each ftar, the eye in the center of the globe, properly placed, would view through each of the holes the very ftars in the heavens reprefented by them.

As it would be impoffible to have any diftinct notion of the ftars, in refpect of their number, order, and diftances, without arranging them in certain forms, called conftellations, this the firft obfervers of the heavens took care to do; and thefe, like kingdoms and countries upon the terreftrial globe, ferve to diftinguifh the different parts of the fuperficies of the celeftial globe. See CONSTELLATION.

The ftars, therefore, are all difpofed in conftellations under the forms of various animals, whofe names and figures are reprefented on the celeftial globe; which were firft invented by the antient aftronomers and poets, and are ftill retained for the better diftinction of thefe luminaries.

Problems on the celeftial GLOBE. 1. *To rectify the globe.* Raife or elevate the pole to the latitude of the place; fcrew the quadrant of altitude in the zenith; fet the index of the hour-circle to the upper XII; and place the globe north and fouth by the compafs and needle; then is it a juft reprefentation of the heavens from the given day at noon. 2. *To find the fun's place in the ecliptic.* Find the day of the month in the calendar on the horizon, and right againft it is the degree of the ecliptic which the fun is in for that day. 3. *To find the fun's declination.* Rectify the globe, bring the fun's place in the ecliptic to the meridian, and that degree which it cuts in the meridian is the declination required. 4. *To find the fun's right afcenfion.* Bring the fun's place to the meridian, and the degree of the equinoctial cut by the meridian, is the right afcenfion required. 5. *To find the fun's amplitude.* Bring the fun's place to the horizon, and the arch of the horizon intercepted between it and the eaft or weft point, is the amplitude, north or fouth. 6. *To find the fun's altitude for any given day and hour.* Bring the fun's place to the meridian; fet the hour-index to the upper XII; then turn the globe till the index points to the given hour, where let it ftand; then fcrewing the quadrant of altitude in the zenith, lay it over the fun's place, and the arch contained between it and the horizon, will give the degrees of altitude required. 7. *To find the fun's azimuth for any hour of the day.* Every thing being done as in the laft problem, the arch of the horizon contained between the north point, and that where the quadrant of altitude cuts it, is the azimuth eaft or weft, as required. 8. *To find the time when the fun rifes or fets.* Find the fun's place for the given day; bring it to the meridian, and fet the hour-hand to XII; then turn the globe till the fun's place touches the eaft part of the horizon, the index will fhew the hour of its rifing: after that, turn the globe to the weft part of the horizon, and the index will fhew the time of its fetting for the given day. 9. *To find the length of any given day or night.* This is eafily known by taking the number of hours between the rifing and fetting of the fun for the length of the day; and the refidue, to 24, for the length of the night. 10. *To find the hour of the day, having the fun's altitude given.* Bring the fun's place to the meridian, and fet the hour-hand to XII; then turn the globe in fuch a manner, that the fun's place may move along by the quadrant of altitude (fixed in the zenith) till it touches the degree of the given altitude; where ftop it, and the index will fhew on the horary circle the hour required. 11. *To find the place of the moon, or any planet, for any given day.* Take Parker's or Weaver's ephemeris, and againft the given day of the month you will find the degree and minute of the fign which the moon or planet poffeffes at noon, under the title of geocentric motions. The degree thus found being marked in the ecliptic on the globe by a fmall notch, or otherwife, you may then proceed to find the declination, right afcenfion, latitude, longitude, altitude, azimuth, rifing, fouthing, fetting, &c. in the fame manner as has been fhewn for the fun. 12. *To explain the phænomena of the harveft moon.* In order to this we need only confider, that when the fun is in the beginning



ning of aries, the full moon on that day must be in the beginning of libra: and since when the sun sets, or moon rises, on that day, those equinoctial points will be in the horizon, and the ecliptic will then be least of all inclined thereto, the part or arch which the moon describes in one day, *viz.* 13°, will take up about an hour and a quarter ascending above the horizon; and, therefore, so long will be the time after sun-set, the next night, before the moon will rise. But at the opposite time of the year, when the sun is in the autumnal, and the full moon in the vernal equinox, the ecliptic will, when the sun is setting, have the greatest inclination to the horizon; and, therefore, 13° will in this case soon ascend, *viz.* in about a quarter of an hour; and so long after sun-set will the moon rise the next day after the full: whence, at this time of the year, there is much more moon-light than in the spring; and hence this autumnal full moon came to be called the harvest moon, the hunter's or shepherd's moon: all which will be clearly shewn on the globe. 13. *To represent the face of the starry firmament for any given hour of the night.* Rectify the globe, and turn it about, till the index points to the given hour; then will all the upper hemisphere of the globe represent the visible half of the heavens, and all the stars on the globe will be in such situations as exactly correspond to those in the heavens; which may therefore be easily found, as will be shewn in the sixteenth problem. 14. *To find the hour when any known star will rise, or come upon the meridian.* Rectify the globe, and set the index to XII; then turn the globe till the star comes to the horizon or meridian, and the index will shew the hour required. 15. *To find at what time of the year any given star will be on the meridian at* XII *at night.* Bring the star to the meridian, and observe what degree of the ecliptic is on the north meridian under the horizon; then find in the calendar on the horizon the day of the year against that degree, and it will be the day required. 16. *To find any particular star.* First find its altitude in the heavens by a quadrant, and the point of the compass it bears on; then, the globe being rectified, and the index turned to the given hour, if the quadrant of altitude be fixed on the zenith, and laid towards the point of the compass on which the star was observed, the star required will be found at the same degree of altitude on the said quadrant, as it was by observation in the heavens.

Problems on the terrestrial GLOBE. 1. *To find the latitude of any place.* Bring the given place to the brazen meridian, and observe what degree it is under, for that is the latitude required. 2. *To rectify the globe for any given place.* Raise the pole so many degrees above the horizon, as are equal to the latitude of the place; then, finding the sun's place, bring it to the meridian; and proceed, as directed in problem 1. on the celestial globe. 3. *To find the longitude of a given place.* Bring the place to the brazen meridian, and observe the degree of the equator under the same, for that expresses the longitude required. 4. *To find any place by the latitude and longitude given.* Bring the given degree of longitude to the meridian, and under the given degree of latitude you will see the place required. 5. *To find all those places which have the same latitude, or longitude, with those of any given place.* Bring the given place to the meridian, then all those places which lie under the meridian have the same longitude; again, turn the globe round on its axis, then all those places, which pass under the same degree of the meridian with any given place, have the same latitude with it. 6. *To find all those places where it is noon at any given hour of the day, in any place.* Bring the given place to the meridian; set the index to the given hour; then turn the globe, till the said index points to the upper XII; and observe what places lie under the brass meridian, for to them it is noon at that time. 7. *When it is noon at any one place, to find what hour it is at any other given place.* Bring the first given place to the meridian, and set the index to the upper XII; then turn the globe till the other given place comes to the meridian, and the index will point to the hour required. 8. *For any given hour of the day in the place where you are, to find the hour of the day in any other place.* Bring the place where you are to the meridian, set the index to the given hour, then turn the globe about, and when the other place comes to the meridian, the index will shew the hour of the day there, as required. 9. *To find the distance between any two places on the globe in english miles.* Bring one place to the meridian, over which fix the quadrant of altitude; and then laying it over the other

other place, count the number of degrees thereon contained between them; which number multiply by 69½, (the number of miles in one degree) and the product is the number of english miles required. 10. *To find how any one place bears from another.* Bring one place to the brass meridian, and lay the quadrant of altitude over the other; and it will shew on the horizon the point of the compass on which the latter bears from the former. 11. *To find those places to which the sun is vertical in the torrid zone, for any given day.* Find the sun's place in the ecliptic for the given time, and bring it to the meridian, and observe what degree thereof it cuts; then turn the globe about, and all those places which pass under that degree of the meridian, are those required. 12. *To find what day of the year the sun will be vertical to any given place in the torrid zone.* Bring the given place to the meridian, and mark the degree exactly over it; then turn the globe round, and observe the two points of the ecliptic which pass under that degree of the meridian: lastly, see on the wooden horizon on what days of the year the sun is in those points of the ecliptic; for those are the days required. 13. *To find those places in the north frigid zone, where the sun begins to shine constantly without setting, on any given day between the 21st of March and the 21st of June.* Find the sun's place in the ecliptic for the given day; bring it to the general meridian, and observe the degrees of declination; then all those places which are the same number of degrees distant from the pole, are the places required to be found. 14. *To find on what day the sun begins to shine constantly without setting, on any given place in the north frigid zone, and how long.* Rectify the globe to the latitude of the place; and, turning it about, observe what point of the ecliptic between aries and cancer, and also between cancer and libra, coincides with the north point of the horizon; then find, by the calendar on the horizon, what days the sun will enter those degrees of the ecliptic, and they will satisfy the problem. 15. *To find the place over which the sun is vertical, on any given day and hour.* Find the sun's place, and bring it to the meridian, and mark the degree of declination for the given hour; then find those places which have the sun in the meridian at that moment; and among them, that which passes under the degree of declination, is the place desired. 16. *To find, for any given day and hour, those places wherein the sun is then rising and setting, or on the meridian; also those places which are enlightened, and those which are not.* Find the place to which the sun is vertical at the given time, and bring the same to the meridian, and elevate the pole to the latitude of the place; then all those places which are in the western semicircle of the horizon have the sun rising, and those in the eastern semicircle see it setting; and to those under the meridian, it is noon. Lastly, all places above the horizon are enlightened, and all below it are in darkness or night. 17. *The day and hour of a solar or lunar eclipse being given, to find all those places in which the same will be visible.* Find the place to which the sun is vertical at the given instant, and elevate the globe to the latitude of the place; then in most of those places above the horizon will the sun be visible during his eclipse; and all those places below the horizon, will see the moon pass through the shadow of the earth in her eclipse. 18. *The length of a degree being given, to find the number of miles in a great circle of the earth, and thence the diameter of the earth.* Admit that one degree contains 69½ english statute miles; then multiply 360 (the number of degrees in a great circle) by 69½, and the product will be 25020, the miles which measure the circumference of the earth. If this number be divided by 3.1416, the quotient will be 7963$\frac{86}{100}$ miles, for the diameter of the earth. 19. *The diameter of the earth being known, to find the surface in square miles, and its solidity in cubic miles.* Admit the diameter be 7964 miles; then multiply the square of the diameter by 3.1416, and the product will be 199250205 very near, which are the square miles in the surface of the earth. Again, multiply the cube of the diameter by 0.5236, and the product 264466789170 will be the number of the cubic miles in the whole globe of the earth. 20. *To express the velocity of the diurnal motion of the earth.* Since a place in the equator describes a circle of 25020 miles in twenty-four hours, it is evident that the velocity with which it moves is at the rate of 1042½ in one hour, or 17$\frac{3}{10}$ miles per minute. The velocity in any parallel of latitude, decreases

creases in the proportion of the co-sine of the latitude to the radius. Thus for the latitude of London, 51° 30′, say,

As radius	10.000000
To the co-sine of lat. 51° 30′	9.794149
So is the velocity in the equator, $17\frac{3}{10}$′	2.232046
To the velocity of the city of London, $10\frac{8}{10}$′	2.032195

That is, the city of London moves about the axis of the earth at the rate of $10\frac{8}{10}$ miles every minute of time. But this is far short of the velocity of the annual motion about the sun; for that is at the rate of 60000 miles per hour, or about 1000 miles each minute, supposing the diameter of the annual orbit to be 82 millions of miles.

Patent-GLOBES, those with Mr. Neale's improvements, for which he obtained his majesty's letters-patent.

The terrestrial globe, with the improvements of this ingenious artist, is represented in plate CXVII, fig. 1, the earth being supposed in that part of its orbit where the north pole A is at its nearest approach to the sun S, which accordingly by the index or ray S R, points to the tropic of cancer; *b* is a moveable circle, which, set to the latitude of a given place, will cause the semicircle *c* to point out the zenith of the said place; *d* represents the ecliptic, *e* the equator, and *f* a screw by which the annual motion may be separated from the diurnal; *g* is a semicircle which always moves at 90° distance from the moon, and thereby becomes the lunar horizon for the northern hemisphere; *h* is an inclined plane on which the stem of the moon P O moves, thereby causing the moon itself to shew its several latitudes, nodes, &c. and by this plane moving the contrary way, in a little more than 19 of the annual revolutions of the globe, is shewn the retrograde motion of the nodes.

This globe is mounted with the horizon *a* fixed vertically, and placed so as to move upon its own axis A H, whereby it represents the diurnal motion of the earth. Hence if the globe be turned round its own axis, by means of the winch at top, the ray from the sun will, in this situation, describe the tropic of cancer: the whole arctic circle will be taken into the enlightened hemisphere, and that of the antarctic circle will be involved in darkness. Let us now suppose the globe turned thirty times about by the winch, the north pole will then be situated as at B, and the index from the sun will point to the sign leo on the ecliptic *d*: after turning the globe thirty times more, the north pole will be removed to C, and the index advanced to virgo; and in this manner may the phænomena of the earth's annual motion be traced through all the signs of the ecliptic and seasons of the year; the index or pointer describing a spiral line, which every day at noon, or turn of the globe, falls at the distance of about fifteen minutes from that of the preceding day. When the earth is so far advanced in its orbit, that the index S R points to the equator, the reason will appear very clear why the days and nights are then equal all the world over; for both poles are now seen in the horizon, which, being the boundary of light and darkness, bisects all the parallels of latitude, and causes an equal distribution of day and night throughout the whole earth.

If the rotation of the globe be continued, the observer will see the north pole descend just as many degrees below the horizon, as the pointer has advanced south of the equator; and when it is arrived at the tropic of capricorn, all that part of the globe within the arctic circle will be involved in continual darkness, whilst that within the antarctic circle enjoys uninterrupted day.

At the distance of 90° from the moon, as has been already observed, is placed a semicircle, which being fixed on the center of the moon's motion, always moves round with her; thereby shewing, throughout her course, all those countries in the northern hemisphere to which she is at any particular time rising, those where she is then setting, and those to whom she is then due south; as also the exact difference of time between the rising or setting of the sun and moon.

The celestial globe (*ibid.* fig. 2.) is mounted not quite so differently from the common globes, as the terrestrial one; its horizon being as usual, and the globe moveable to the latitude of any country; only instead of those upright pillars to support the horizon, as in common ones, here semicircles are fixed on the pedestal, and from the pole of the equator a motion is conveyed to the pole of the ecliptic; where two arms or indices are placed, on which are fixed the artificial sun and moon. These, as the globe is turned about its axis by the winch W, keep their exact motions over the same, by means of the wheel-work at Q, in

like manner as thofe luminaries do in the heavens; fo that being once fet right by an ephemeris, they will remain fo, and thereby fhew the rifing and fetting of thefe luminaries, with the length of the day and night, together with the true caufe of all the viciffitudes of the feafons; and how, notwithftanding their apparent motion from eaft to weft, they really move from weft to eaft; the moon, in a very little more than twenty-nine days and a half; and the fun, in a year. See the articles EARTH, SUN, and MOON.

To the center of the fun two jointed ftems are occafionally fcrewed on, and to thefe are fixed mercury and venus; which by the faid joints may be fet to their proper ftations, and thereby feveral entertaining problems may be folved.

From what has been faid it is evident, that the ufual problems on the common globes, and moft of thofe with the orrery, may be folved by thefe curious machines.

Problems peculiar to the patent-GLOBES. 1. *To rectify thefe globes.* This, on the celeftial globe, is performed in the fame manner as on the common globes. But the terreftrial globe admits of no fuch rectification; for inftead of raifing or lowering the pole of the globe itfelf, according to the latitude of the place, we muft here rectify a moveable brafs horizon, fo as that the given place fhall be in the zenith of the faid horizon. 2. *To rectify the fun or moon, according to thefe globes.* Having found the fun's place in the ecliptic, in the common way, turn the fun about by its ftem till it is directly oppofite to the fame fign and degree of the ecliptic upon the globe. The fame may alfo be done with refpect to the moon, having firft found her place by an ephemeris for that day. 3. *To fhew on thefe globes the caufe of an eclipfe of the fun or moon.* This is felf-evident on either globe, by turning them by the winch till the two luminaries come in conjunction with, or oppofition to each other, provided they happen to be in or near the nodes. 4. *To explain the reafon why they happen no oftener.* This will appear no lefs evident, by fetting the moon to any confiderable latitude, and turning the globe till fhe comes in conjunction with the fun; for then the pointer from the fun will be feen to pafs either above or below her, according as fhe is in north or fouth latitude; fo that there can be no eclipfe of the fun, when the moon is not in or near her nodes. 5. *To exhibit a natural reprefentation of the retrograde motion of the moon's nodes.* This is done by only turning the globe with the winch, and obferving that the place where the moon croffes the ecliptic, in its motion round the earth, is every time in different places; which are found to be retrograde, or contrary to the order of the figns; that is, they move backward thro' all the figns from eaft to weft. 6. *The day and hour of a folar eclipfe being given, to find all thofe places on the globe to which the fame will be vifible.* Turn the globe till the given day comes oppofite to the fun, and the place where you are to the pointer; fet the index to 12, then turn the globe till the index points to the given hour; fet the moon in conjunction with the fun: then all the places above the folar horizon are thofe to which the eclipfe will be vifible. 7. *To find the fame in a lunar eclipfe.* Proceed as in the laft problem; only inftead of the moon's being in conjunction, fhe muft now be in oppofition; and inftead of viewing all the countries on that fide of the horizon towards the fun, you muft furvey thofe on the oppofite fide: for they are the countries to which the lunar eclipfe will be vifible. 8. *To exhibit the phafes of mercury and venus.* Set them to any given ftation within the enlightened hemifphere of the celeftial globe; and it may be obferved, that their different phafes in thofe feveral ftations will be in all refpects analogous to thofe of our moon. 9. *To demonftrate, that in a certain latitude, the inhabitants may obferve the fun, moon, mercury, and venus all rifing together on a particular day; and yet, on the fame day, may fee the moon fet twelve hours before the fun, mercury fourteen hours after the moon, and venus fix hours after all three.* Rectify the globe to the latitude of 66½; let the moon rife near the tropic of capricorn, the fun at the beginning of aries, mercury about fifteen degrees in aries, and venus about eighteen degrees in taurus, with five or fix degrees of north latitude; then turn the globe about, and you will find by the index the difference of time fought for. 10. *To find the height of the diurnal arch of the luminaries and planets aforefaid, on any given day.* The globe being rectified, fcrew the quadrant of altitude to the zenith of the place, which bring to the meridian; then turn about the globe to the given day, and the degree of the quadrant, each

each respectively pass over, is the height of their arches sought. 10. *To shew why neither mercury nor venus can be seen on the meridian of London at midnight, as all the other planets at certain times are.* Set these two planets to their greatest elongation or distance from the sun; and, by turning the globe about, the impossibility of the thing will be evident.

GLOBE FISH, *orbis*. See ORBIS.

GLOBULAR, in general, an appellation given to things of a roundish figure, like that of a globe.

GLOBULAR CHART, a name given to the representation of the surface, or of some part of the surface of the terrestrial globe upon a plane, wherein the parallels of latitude are circles nearly concentric, the meridians curves bending towards the poles, and the rhumb-lines are also curves. See the article CHART.

GLOBULAR SAILING. See SAILING.

GLOBULARIA, in botany, a genus of plants of the tetrandria-monogynia class, the proper flower of which is formed of a single petal, tubular at the base, and divided into five segments at the limb; the universal corolla is nearly equal; there is no pericarpium, but the proper perianthium closes at its top, and contains the seed, which is single, and of an oval figure.

Of this genus there are several species, among which that called by some the alypum of Montpelier, is a violent cathartic and emetic, and is sometimes given in dropsies with success; but it ought to be used with great caution: its bark contains its principal virtues.

GLOBULE, a diminutive of globe, frequently used by physicians in speaking of the red spherical particles of the blood. See the article BLOOD.

GLOCESTER, the capital of Glocestershire, ninety miles west of London: west long. 2° 16′, and north lat. 51° 50′. It is a bishop's see, and sends two members to parliament.

GLOGAW, a city of Silesia, situated on the river Oder, 45 miles north-west of Breslaw: east long. 16° 8′, and north lat. 51° 40′.

Lesser GLOGAW, a town of Silesia, fifty miles south of Breslaw.

GLORIA PATRI, among ecclesiastical writers. See DOXOLOGY.

GLORIOSA, SUPERB LILLY, in botany, a genus of the hexandria-monogynia class of plants, the flower of which consists of six oblongo-lanceolated, undulated, and very long petals, reflex nearly to the base; the fruit is an oval pellucid capsule, containing three cells, and numerous globose seeds, disposed in a double series.

GLOSS, in matters of literature, denotes an exposition or explication of the text of any author, whether in the same language, or any other; in which sense it differs little from commentary. See the article COMMENTARY.

GLOSS, among artificers, the lustre or brightness set upon cloth, silk, and the like. See CLOTH, SILK, &c.

GLOSSARY, *glossarium*, a sort of dictionary, explaining the obscure and antiquated terms in some old author; such are Du Cange's latin and greek glossaries, Spelman's Glossary, and Kennet's Glossary at the end of his Parochial Antiquities.

GLOSSOCOMON, in surgery, an instrument, or sort of case, contrived by the antient surgeons, for containing a fractured leg or thigh.

GLOSSOCOMON, in mechanics, the name by which Hiero calls a machine, composed of several dented wheels with pinions, and used for raising great weights.

GLOSSOPETRA, in natural history, a genus of extraneous fossils, so called from their having been supposed the tongues of serpents turned to stone, tho' they are really the teeth of sharks, and are daily found in the mouths of those fishes, wherever taken. See FOSSIL.

The several sizes of teeth of the same species, and the several different species of sharks, furnish us with a vast variety of these fossile teeth. Their usual colours are black, bluish, whitish, yellowish, or brown. In shape they are usually somewhat approaching to triangular; some are simple, and others have a smaller point on each side the large one; many of them are quite straight, but they are frequently met with crooked, and bent in all the different directions, some inwards, some outwards, and some sideways: they are also of various sizes, the larger ones being four or five inches long, and the smaller less than a quarter of an inch. See plate CXXIV. fig. 1.

They are found with us in the strata of blue clay, and are very plentiful in the clay-pits of Richmond, and some other places; but they are no where so common as in the island of Malta.

GLOTTIS, in anatomy, the mouth or aperture of the larynx, through which the air ascends and descends in respiring.

It

It is of an elliptic figure, and furniſhed with cartilages and muſcles, by means of which it is occaſionally dilated or ſtraitened, ſo as to give that wonderful variety of notes, of which the voice is capable, in ſpeaking and ſinging. See LARYNX.

GLOUCESTER, or GLOCESTER. See the article GLOCESTER.

GLOVE, a covering for the hand and wriſt.

Gloves, with reſpect to commerce, are diſtinguiſhed into leathern-gloves, ſilk-gloves, thread-gloves, cotton-gloves, worſted-gloves, *&c.* Leathern-gloves are made of chamois, kid, lamb, doe, elk, buff, *&c.*

Foreign gloves, on their importation, pay the following duties, *viz.* gloves of Canary, Milan, or Venice, unwrought, the dozen pair, pay 4 s. $9\frac{45}{100}$d. draw back 4 s. $3\frac{75}{100}$d. Thoſe of Canary, Milan, or Venice, wrought with gold or ſilver, the dozen pair, pay 19 s. $1\frac{80}{100}$d. draw back 17 s. 3 d. French gloves, the groſs, pay 1 l. 13 s. $10\frac{12\frac{1}{2}}{100}$d. draw back 1 l. $1\frac{87\frac{1}{2}}{100}$d. French, wrought with gold or ſilver, the dozen pair, pay 2 l. 14 s. $1\frac{80}{100}$d. draw back 1 l. 12 s. 3 d. Spaniſh gloves, plain, the dozen pair, pay 3 s. $7\frac{8\frac{3}{4}}{100}$d. draw back 3 s. $2\frac{81\frac{1}{4}}{100}$d. Silk-gloves knit, the dozen pair, pay 11 s. $5\frac{40}{100}$d. draw back 10 s. 6 d. More for every pound weight 1 s. $10\frac{50}{100}$d. draw back 1 s. $10\frac{50}{100}$d. Thoſe of Vandou, the dozen pair, pay 2 s. $4\frac{72\frac{1}{2}}{100}$d. draw back 2 s. $1\frac{87\frac{1}{2}}{100}$d. And more for ſuch as are made of leather, for every 20 s. value, upon oath, 6 s.

GLOUTIUS, in anatomy, a muſcle more uſually called the glutæus major.

GLOW-WORM, the engliſh name of an inſect, called by zoologiſts cicindela. See the article CICINDELA.

GLUCKSTAT, a fortified town of Germany, ſituated on the eaſt ſide of the river Elbe, thirty miles north-weſt of Hamburgh: eaſt longitude 9°, and north latitude 54° 20′.

GLUE, among artificers, a tenacious viſcid matter, which ſerves as a cement to bind or connect things together.

Glues are of different kinds, according to the various uſes they are deſigned for, as the common glue, glove-glue, and parchment-glue; whereof the two laſt are more properly called ſize. See SIZE.

The common or ſtrong glue is chiefly uſed by carpenters, joiners, cabinet-makers, *&c.* and the beſt kind is that made in England, in ſquare pieces of a ruddy brown colour; and, next to this, the flanders glue. It is made of the ſkins of animals, as oxen, cows, calves, ſheep, *&c.* and the older the creature is, the better is the glue made of its hide. Indeed, whole ſkins are but rarely uſed for this purpoſe, but only the ſhavings, parings, or ſcraps of them; or the feet, ſinews, *&c.* That made of whole ſkins, however, is undoubtedly the beſt; as that made of ſinews is the very worſt.

The method of making GLUE. In making glue of parings, they firſt ſteep them two or three days in water; then waſhing them well out, they boil them to the conſiſtence of a thick jelly; which they paſs, while hot, through ozier-baſkets, to ſeparate the impurities from it, and then let ſtand ſome time, to purify it further: when all the filth and ordures are ſettled to the bottom of the veſſel, they melt and boil it a ſecond time. They next pour it into flat frames or moulds, whence it is taken out pretty hard and ſolid, and cut into ſquare pieces or cakes. They afterwards dry it, in the wind, in a ſort of coarſe net; and at laſt ſtring it, to finiſh its drying. The glue-made of ſinews, feet, *&c.* is managed after the ſame manner; only with this difference, that they bone and ſcour the feet, and do not lay them to ſteep.

The beſt glue is that which is oldeſt; and the ſureſt way to try its goodneſs, is to lay a piece to ſteep three or four days, and if it ſwell conſiderably without melting, and when taken out reſumes its former drineſs, it is excellent.

A glue that will hold againſt fire or water, may be made thus: mix a handful of quick-lime with four ounces of linſeed-oil; boil them to a good thickneſs, then ſpread it on tin-plates in the ſhade, and it will become exceeding hard, but may be eaſily diſſolved over a fire, as glue, and will affect the buſineſs to admiration.

Method of preparing and uſing GLUE. Set a quart of water on the fire, then put in about half a pound of good glue, and boil them gently together till the glue be entirely diſſolved and of a due conſiſtence. When glue is to be uſed, it muſt be made thoroughly hot; after which, with a bruſh

brush dipped in it, besmear the faces of the joints as quick as possible; then clapping them together, slide or rub them lengthwise one upon another, two or three times, to settle them close; and so let them stand till they are dry and firm.

Fish-GLUE, a name sometimes given to ichthyocolla. See ICHTHYOCOLLA.

GLUME, *gluma*, among botanists, a kind of cup, consisting of two or three membranous valves, which are often pellucid at their edges. This sort of cup belongs to the grasses.

GLUTÆUS, in anatomy, the name of three muscles, which form the buttocks, and from their size are called maximus, medius, and minimus. They all arise in the external surface of the ilium, ischium, and os sacrum: the termination of the first, or greatest, is about four fingers-breadth from the great trochanter, and the terminations of the two others are in this trochanter.

GLUTINATIVE MEDICINES, the same with agglutinants. See AGGLUTINANTS.

GLYCINE, SCARLET-PEA, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower, and an oblong bilocular pod, containing a number of kidney-shaped seeds, of a scarlet colour, spotted with black.

GLYCONIAN VERSE, in antient poetry, consists of three feet, whereof the first is a spondee, the second a choriambus, and the last a pyrrhichius; or the first may be a spondee, and the other two dactyls.

Thus, *Mens re-|gnum bona pos|sidet.*
or, *Mens re-|gnum bona |possidet.*

GLYCYRRHIZA, *liquorice*, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower, consisting of four petals; the fruit is an oblong, compressed, and unilocular pod, containing a few kidney-shaped seeds. See plate CXIX. fig. 3.

For the description and medicinal virtues of liquorice, see the article LIQUORICE.

GLYPH, in sculpture and architecture, denotes any canal or cavity, used as an ornament.

GLYSTER, or CLYSTER, among physicians. See the article CLYSTER.

GMELINA, in botany, a genus of the didynamia-angiospermia class of plants, the flower of which is campanulated, and also divided into four segments, the fruit is a globose unilocular berry, surrounding a bilocular nut or kernel.

GNAPHALIUM, *cudweed*, in botany, a genus of the syngenesia-polygamia-superflua class of plants, with numerous hermaphrodite flowers on its disc, and a few female ones on the verge; there is no pericarpium; the seeds, which are oblong, single, and crowned with down, being contained in the cup.

Cudweed is esteemed drying and astringent, and is recommended in dysenteries, hæmorrhages, and all kinds of fluxes; but the modern pharmacy makes little use of it.

GNAT, in zoology, an insect of the fly-kind, called by authors culex. See the article CULEX.

There are several species of gnats, distinguished partly by their size, and partly by the different colours with which they are variegated, as black, brown, grey, yellow, &c. They belong to the order of two-winged flies.

GNESNA, the capital city of great Poland, situated one hundred and ten miles west of Warsaw: east long. 18°, and north lat. 53°.

It is the see of an archbishop, who is always primate of Poland. See the article POLAND.

GNIDIA, in botany, a genus of the octandria-monogynia class of plants, the flower of which consists of four petals, inserted into the cup; there is no pericarpium; the seed is single, and retained in the bottom of the cup.

GNOME is often used in a synonymous sense with apophthegm. See APOPHTHEGM.

GNOMES, *gnomi*, certain invisible people, who, according to the cabbalists, inhabit the inner parts of the earth. They are supposed small in stature, and the guardians of quarries, mines, &c. See the article CABBALISTS.

GNOMON, in dialling, the style, pin, or cock of a dial; which, by its shadow, shews the hour of the day. The gnomon of every dial represents the axis of the world. See DIAL and DIALLING.

GNOMON, in geometry. If, in a parallelogram ABCD (pl. CXVIII. fig. 1. n° 1.) the diameter AC be drawn; also two lines EF, HI, parallel to the sides of the parallelogram, and cutting the diameter in one and the same point G, so that the parallelogram is, by these parallels, divided into four parallelograms, then are the two parallelograms DG, BG, through which the diameter does not pass, called complements; those through which the diameters pass, EH, FI, are called the parallelograms about the

the diameter; and a gnomon confifts of the two complements, and either of the parallelograms about the diameter, *viz.* GD+HE+EI, or GD+FI+GB.

GNOMON, in aftronomy, a ftyle erected perpendicular to the horizon, in order to find the altitude of the fun. Thus, in the right-angled triangle ABC *ibid.* n° 2. are given, AB the length of the ftyle, BC the length of its fhadow, and the right angle ABC. Hence, making CB the radius, we have this analogy for finding the angle ACB, the fun's altitude, *viz.* BC : AB : : radius : tangent of the angle C.

By means of a gnomon, the fun's meridian altitude, and confequently the latitude of the place, may be found more exactly than with the fmaller quadrants. See the article QUADRANT.

By the fame inftrument, the height of any object GH may be found; for as DF (*ibid.* n° 3.) the diftance of the obferver's eye from the gnomon, is to DE, the height of the ftyle; fo is FH, the diftance of the obferver's eye from the object, to GH, its height.

GNOMON *of a globe*, the index of the hour-circle. See the article GLOBE.

GNOMONIC, fomething belonging to a gnomon. See the preceding article.

GNOMONIC COLUMN. See COLUMN.

GNOMONIC PROJECTION. See the article PROJECTION.

GNOMONICS, *gnomonica*, the art of dialing, or of drawing fun and moon-dials, on any given plane. See the articles DIAL and DIALLING.

GNOSTICS, in church-hiftory, chriftian heretics fo called, it being a name which almoft all the ancient heretics affected to take, to exprefs that new knowledge and extraordinary light to which they made pretenfions; the word gnoftic fignifying a learned, or enlightened perfon.

St. Epiphanius afcribes the origin of the gnoftics to Simon Magus, and fays that they acknowledged two principles, a good and a bad. They fuppofed there were eight different heavens, each of which was governed by its particular prince: the prince of the feventh heaven, whom they named Sabaoth, created the heavens and the earth, the fix heavens below him, and a great number of angels. In the eighth heaven they placed their Barbelo, or Barbero, whom they fometimes called the father and fometimes the mother of the univerfe. All the gnoftics diftinguifhed the creator of the univerfe from God, who made himfelf known to men by his Son, whom they acknowledged to be the Chrift. They denied that the Word was made flefh; and afferted that Jefus Chrift was not born of the Virgin Mary, that he had a body only in appearance, and that he did not fuffer in reality. They neither believed a refurrection, nor a judgment to come; but imagined that thofe who had not been inftructed in their maxims, would return into the world, and pafs into the bodies of hogs and other of the like animals. They had feveral apocryphal books, as the Gofpel of St. Philip, the Revelations of Adam, the Gofpel of Perfection, &c.

GO is fometimes ufed in a fpecial fignification, in our law; as *to go without day*, is to be difmiffed the court.

GOA, a city and fea-port of the hither India, fituated in an ifland of the river Mandoua, and fubject to the Portuguefe: eaft long. 73° 20′, and north lat. 15° 20′.

GOAD, a pointed ftick, or rod, armed with a fharp iron-pin at the end, to prick oxen or other cattle forwards.

GOAL, or GAOL. See GAOL.

GOAT, *capra*, in zoology, a quadruped of the order of the pecora. See the article CAPRA.

The common goat with carinated and arcuated horns, is nearly of the fize of the fheep, only that the wool of the latter makes it appear larger. The furr of the goat is of a pale dun, and the hairs rigid and waved, but not curled as in the fheep. It is a native of moft parts of Europe. The buck goat has under his jaws two wattles or tufts like a beard. The female alfo refembles the male, and is valued if fhe have large teats, a great udder, and no horns, or at leaft very fmall ones. Thefe animals require almoft nothing to keep them. Their milk is efteemed the greateft nourifher of all liquids, women's milk excepted, and very comfortable to the ftomach. The young kids alfo are very good for the table, and may be managed in all refpects like lambs.

GOAT'S BEARD, *tragopogon*, in botany. See the article TRAGOPOGON.

GOAT'S BLOOD, *fanguis hirci*. See the article SANGUIS.

GOAT'S RUE, *galega*, in botany. See the article GALEGA.

GOAT-SUCKER, *caprimulgus*, in ornithology, a fpecies of hirundo. See the article HIRUNDO.

GOAT'S THORN, the fame with tragacanth.

GOBELINS,

GOBELINS, a celebrated manufactory for tapeftry, eftablifhed by Mr. Colbert, at Paris, in 1667. See TAPESTRY.

GOBIO, a fpecies of cyprinus, with the upper jaw longeft, and two cirri at the mouth.

GOBIUS, in ichthyology, a genus of acanthopterygious fifhes, with five fmall bones in the membrane of the gills, and the belly-fins of which grow together into a funnel-fhape.

To this genus belongs, 1. The fea-gudgeon, or variegated gobius with fourteen rays in the hinder back-fin; it grows to eight inches in length, and is tolerably thick in proportion: it is very beautifully variegated with brown, white, yellow, green, blue, and black. See pl. CXXIII. fig. 1. n° 1. 2. The paganellus, or gobius with a yellow tranfverfe line on the top of the firft back-fin: it grows to about fix inches in length, and is tolerably thick in proportion. ibid. n° 2. 3. The jozo, or gobius with the ventral fin blue, and the rays of the back-fin affurgent. 4. The aphua, or aphyacobites, or fmall gobius with a great many rays in the fecond back-fin: its length is only an inch and half. *ibid.* n° 3.

GOBIUS is alfo a name ufed by different authors for feveral other diftinct fifhes. *viz.* 1. The cyprinus with the upper jaw longeft, and two cirri at the mouth: this is the gobius fluviatilis. 2. The pearch with eight or nine black tranfverfe lines on each fide. And, 3. The fmooth cottus with two fpines on the head. See the article CYPRINUS, PEARCH, &c.

GOBLET, a large drinking-cup of a round figure, without either foot or handle.

GOBONE', or GOBONY, in heraldry, the fame with componed. See COMPONED.

GOD, *Deus*, the fupreme being, the firft caufe or creator of the univerfe, and the only true object of religious worfhip.

The Hebrews called him Jehovah; which name they never pronounced, but ufed inftead of it the words Adonai, or Elohim. See the articles ADONAI, ELOHIM, and JEHOVAH.

God, fays fir Ifaac Newton, is a relative term, and has refpect to fervants. It denotes, indeed, an eternal, infinite, abfolutely perfect being: but fuch a being without dominion, would not be god. The word god frequently fignifies lord, but every lord is not god. The dominion of a fpiritual being, or lord, conftitutes god; true dominion, true god; the fupreme, fupreme; pretended, pretended. From fuch true dominion it follows that the true God is living, intelligent, and powerful; and from his other perfections, that he is fupreme, or fupremely perfect. He is eternal and infinite, omnipotent and omnifcient; that is, he endures from eternity to eternity, and is prefent from infinity to infinity. He governs all things that exift, and knows all things that are to be known. He is not eternity or infinity, but eternal and infinite. He is not duration and fpace, but he endures and is prefent: he endures always, and is prefent every where; and by exifting always and every where, conftitutes the very things we call duration and fpace, eternity and infinity. He is omniprefent, not only virtually, but fubftantially; for power without fubftance cannot fubfift. All things are contained and move in him, but without any mutual paffion; that is, he fuffers nothing from the motions of bodies, nor do they undergo any refiftance from his omniprefence.

It is confeffed, that God exifts neceffarily; and by the fame neceffity he exifts always and every where. Hence alfo he muft be perfectly fimilar; all eye, all ear, all brain all arm, all perception, intelligence, and action; but after a manner not at all corporeal, not at all like men; after a manner altogether unknown to us. He is deftitute of all body, and bodily fhape, and therefore cannot be feen, heard, or touched; nor ought to be worfhipped under the reprefentation of any thing corporeal. We know him only by his properties, or attributes, by the moft wife and excellent ftructure of things, and by final caufes: but we adore and worfhip him only on account of his dominion; for God, fetting afide dominion, providence, and final caufes, is nothing elfe but fate and nature.

The plain argument, fays Mr. Maclaurin, for the exiftence of the deity, obvious to all, and carrying irrefiftible conviction with it, is from the evident contrivance and fitnefs of things for one another, which we meet with throughout all parts of the univerfe. There is no need of nice or fubtile reafonings in this matter; a manifeft contrivance immediately fuggefts a contriver. It ftrikes us like a fenfation; and artful reafonings againft it may puzzle us, but it is without fhaking our belief. No perfon, for example, that knows the principles of optics and the ftructure of the eye, can believe that it

it was formed without ſkill in that ſcience; or that the ear was formed without the knowledge of ſounds; or that the male and female in animals were not formed for each other, and for continuing the ſpecies. All our accounts of nature are full of inſtances of this kind. The admirable and beautiful ſtructure of things for final cauſes, exalt our idea of the contriver: the unity of deſign ſhews him to be one. The great motions in the ſyſtem, performed with the ſame facility as the leaſt, ſuggeſt his almighty power, which gave motion to the earth and the celeſtial bodies with equal eaſe as to the minuteſt particles. The ſubtilty of the motions and actions in the internal parts of bodies, ſhews that his influence penetrates the inmoſt receſſes of things, and that he is equally active and preſent every where. The ſimplicity of the laws that prevail in the world, the excellent diſpoſition of things, in order to obtain the beſt ends, and the beauty which adorns the works of nature, far ſuperior to any thing in art, ſuggeſt his conſummate wiſdom. The uſefulneſs of the whole ſcheme, ſo well contrived for the intelligent beings that enjoy it, with the internal diſpoſition, and moral ſtructure of thoſe beings themſelves, ſhew his unbounded goodneſs. Theſe are the arguments which are ſufficiently open to the views and capacities of the unlearned; while, at the ſame time they acquire new ſtrength and luſtre from the diſcoveries of the learned. The deity's acting and interpoſing in the univerſe, ſhew that he governs, as well as formed it; and the depth of his counſels, even in conducting the material univerſe, of which a great part ſurpaſſes our knowledge, keep up an inward veneration and awe of this great being, and diſpoſe us to receive what may be otherwiſe revealed to us, concerning him. It has been juſtly obſerved that ſome of the laws of nature now known to us, muſt have eſcaped us, if we had wanted the ſenſe of ſeeing. It may be in his power to beſtow upon us other ſenſes, of which we have at preſent no idea; without which it may be impoſſible for us to know all his works, or to have more adequate ideas of himſelf. In our preſent ſtate, we know enough to be ſatisfied of our dependency upon him, and of the duty we owe to him, the lord and diſpoſer of all things. He is not the object of ſenſe; his eſſence, and indeed that of all other ſubſtances, is beyond the reach of all our diſcoveries: but his attributes clearly appear in his admirable works. We know, that the higheſt conceptions we are able to form of them, are ſtill beneath his real perfections; but his power and dominion over us, and our duty towards him, are manifeſt.

Though God has given us no innate ideas of himſelf, ſays Mr. Locke, yet having furniſhed us with thoſe faculties our minds are endowed with, he hath not left himſelf without a witneſs; ſince we have ſenſe, perception, and reaſon, and cannot want a clear proof of him, as long as we carry ourſelves about us. To ſhew, therefore, that we are capable of knowing, that is, being certain that there is a God; and how we may come by this certainty, I think we need go no farther than ourſelves, and that undoubted knowledge we have of our own exiſtence. I think it is beyond queſtion, that man has a clear perception of his own being: he knows certainly that he exiſts, and that he is ſomething. In the next place, man knows, by an intuitive certainty, that bare nothing can no more produce any real being, than it can be equal to two right angles. If, therefore, we know there is ſome real being, it is an evident demonſtration, that from eternity there has been ſomething: ſince what was not from eternity, had a beginning; and what had a beginning, muſt be produced by ſomething elſe. Next it is evident, that what has its being from another, muſt alſo have all that which is in and belongs to its being from another too: all the powers it has, muſt be owing to, and received from the ſame ſource. This eternal ſource then of all beings, muſt be alſo the ſource and original of all power; and ſo this eternal being muſt be alſo the moſt powerful.

Again, man finds in himſelf perception and knowledge: we are certain then that there is not only ſome being, but ſome knowing intelligent being in the world. There was a time then, when there was no knowing being, or elſe there has been a knowing being from eternity. If it be ſaid, there was a time when that eternal being had no knowledge; I reply, that then it is impoſſible there ſhould have ever been any knowledge: it being as impoſſible that things wholly void of knowledge, and operating blindly, and without any perception, ſhould produce a knowing being, as it is impoſſible that a triangle ſhould make itſelf three angles bigger

bigger than two right ones. Thus, from the confideration of ourfelves, and what we infallibly find in our own conftitutions, our reafon leads us to the knowledge of this certain and evident truth, that there is an eternal, moft powerful, and knowing being, which whether any one will call God, it matters not. The thing is evident; and from this idea, duly confidered, will eafily be deduced all thofe other attributes we ought to afcribe to this eternal being. From what has been faid, it is plain to me, that we have a more certain knowledge of the exiftence of a God, than of any thing our fenfes have not immediately difcovered to us. Nay, I prefume I may fay, that we more certainly know that there is a God, than that there is any thing elfe without us. When I fay, we know, I mean, there is fuch a knowledge within our reach, which we cannot mifs, if we will but apply our minds to that, as we do to feveral other inquiries.

It being then unavoidable for all rational creatures to conclude, that fomething has exifted from eternity, let us next fee what kind of a thing that muft be. There are but two forts of beings in the world, that man knows or conceives; fuch as are purely material, without fenfe or perception; and fenfible perceiving beings, fuch as we find ourfelves to be. Thefe two forts we fhall call cogitative and incogitative beings; which, to our prefent purpofe, are better than material and immaterial.

If then there muft be fomething eternal, it is very obvious to reafon, that it muft neceffarily be a cogitative being; becaufe it is as impoffible to conceive that bare incogitative matter fhould ever produce a thinking intelligent being, as that nothing of itfelf fhould produce matter. Let us fuppofe any parcel of matter eternal, we fhall find it in itfelf unable to produce any thing. Let us fuppofe its parts firmly at reft together; if there were no other being in the world, muft it not eternally remain fo, a dead unactive lump? is it poffible to conceive that it can add motion to itfelf, or produce any thing? Matter then, by its own ftrength, cannot produce in itfelf fo much as motion. The motion it has, muft alfo be from eternity, or elfe added to matter by fome other being, more powerful than matter. But let us fuppofe motion eternal too; but yet matter, incogitative matter, and motion could never produce thought. Knowledge will ftill be as far beyond the power of nothing to produce. Divide matter into as minute parts as you will, vary its figure and motion as much as you pleafe, it will operate no otherwife upon other bodies, of proportionable bulk, than it did before this divifion. The minuteft particles of matter, knock, repel, and refift one another, juft as the greater do, and that is all they can do: fo that if we fuppofe nothing eternal, matter can never begin to be: if we fuppofe bare matter without motion eternal, motion can never begin to be: if we fuppofe only matter and motion eternal, thought can never begin to be: for it is impoffible to conceive, that matter, either with or without motion, could have originally in and from itfelf, fenfe, perception, and knowledge, as is evident from hence, that then fenfe, perception, and knowledge muft be a property eternally infeparable from matter, and every particle of it. Since, therefore, whatfoever is the firft eternal being, muft neceffarily be cogitative; and whatfoever is firft of all things muft neceffarily contain in it, and actually have at leaft all the perfections that can ever after exift; it neceffarily follows, that the firft eternal being cannot be matter. If, therefore, it be evident, that fomething muft neceffarily exift from eternity, it is alfo as evident, that that fomething muft be a cogitative being. For it is as impoffible that incogitative matter fhould produce a cogitative being, as that nothing, or the negation of all being, fhould produce a pofitive being, or matter.

This difcovery of the neceffary exiftence of an eternal mind, fufficiently leads us to the knowledge of God: for it will hence follow, that all other knowing beings that have a beginning, muft depend on him, and have no other ways of knowledge or extent of power, than what he gives them; and therefore if he made thofe, he made alfo the lefs excellent pieces of this univerfe, all inanimate bodies, whereby his omnifcience, power, and providence will be eftablifhed; and from thence all his other attributes neceffarily follow.

With refpect to chriftians, it need only be juft mentioned, that they were very early divided in opinion, as to the nature and effence of the fupreme Being; a great part worfhipping three perfons in the unity of the godhead, whilft others abfolutely rejected a trinity of perfons, and afferted the unity of the divine nature,

both as to perſon and ſubſtance. See the articles ARIANS and TRINITARIANS.

With reſpect to the theology of the pagans, it is thought by moſt learned men, that they acknowledged but one God; and that the many different divinities worſhiped by them, were but attributes and actions of one and the ſame God. This may probably be true of the wiſer heathens; and indeed there are many ſtrong and beautiful paſſages in pagan authors, to prove that theſe acknowledged but one God. Thus Pythagoras taught the unity of God, and defined him to be a mind penetrating and diffuſing itſelf through all the parts of the univerſe, from which all animals receive life: and Plato called God the being which is; and whenever he mentions the deity, it is always in the ſingular number.

It is a celebrated diviſion of the heathen gods into *dii majorum gentium*, and *dii minorum gentium*; that is, into the ſuperior and inferior gods. Another diviſion was taken from their place of reſidence; thus there were celeſtial, terreſtrial, infernal, marine, and ſylvan gods. They were alſo divided into animal and natural gods: the animal gods were mortals, who had been raiſed to divinity by ignorance and ſuperſtition (ſee APOTHEOSIS); and the natural gods, the parts of nature, ſuch as the ſtars, the elements, mountains, rivers, &c. There were alſo deities, who were ſuppoſed to preſide over particular perſons: ſome had the care of women in child-birth; others, the care of children and young perſons; and others were the deities of marriage. Each action, virtue, and profeſſion had alſo its particular god: the ſhepherds had their Pan; the gardeners, their Flora; the learned, their Mercury and Minerva; and the poets, their Apollo and the Muſes. See the articles GENIUS, LARES, PENATES, &c.

GODALMIN, a market town of Surry, thirty miles ſouth-weſt of London.

GOD-BOTE, an eccleſiaſtical fine impoſed for offences againſt God.

GODDESS, a heathen deity of the female ſex.

The antients had almoſt as many goddeſſes, as gods; ſuch were Juno, the goddeſs of air; Diana, the goddeſs of woods, &c. and under this character were repreſented the virtues, graces, and principal advantages of life, Truth, Juſtice, Piety, Liberty, Fortune, Victory, &c.

It was the peculiar privilege of the goddeſſes to be repreſented naked on medals; for it was ſuppoſed that the imagination muſt be awed and reſtrained by the conſideration of the divine character.

GOD-FATHERS, and GOD-MOTHERS, perſons who at the baptiſm of infants, anſwer for their future conduct, and ſolemnly promiſe that they will renounce the devil and all his works, and follow a life of piety and virtue, and by this means lay themſelves under an indiſpenſable obligation to inſtruct them, and watch over their conduct. See SPONSORS.

This cuſtom is of great antiquity in the chriſtian church, and was probably inſtituted to prevent children being brought up in idolatry, in caſe their parents died before they arrived at years of diſcretion.

The number of god-fathers and god-mothers is reduced to two, in the church of Rome; and three, in the church of England: but formerly they had as many as they pleaſed.

GODWIT, *totanus*, in ornithology. See TOTANUS.

GOES, a port-town of Zeland, in Holland, ten miles eaſt of Middleburgh.

GOGMAGOG-HILLS lie three miles ſouth-eaſt of Cambridge: remarkable for the intrenchments caſt up on them.

GOLCONDA, the capital of a province of the ſame name, in the hither India: eaſt long. 77°, and north lat. 16°.

GOLD, *aurum*, a yellow metal, the heavieſt, pureſt, moſt ductile, and ſhining, and on theſe accounts the moſt valuable of all metals. See the article METAL.

Gold is the moſt frequently found native of all the metals; and is indeed very rarely found in a ſtate of ore, that is, diveſted of its metallic form, by its particles being penetrated by, and intimately mixed with ſulphur: and in the few inſtances in which it is found thus, it never conſtitutes a peculiar ore, but is found intermixed among the ores of other metals; and moſt frequently among thoſe of ſilver, or thoſe in which, though ſome other be the predominant metal, there is a large quantity of ſilver in which the gold lies in its ſtate of ore. See the article ORE.

Native gold, though free from the penetrating ſulphurs which reduce metals to ores, is yet very ſeldom found pure, but has almoſt conſtantly an admixture of ſilver with it, and very frequently of copper: when it has copper in it, it is eaſily diſcovered, if in any conſiderable quantity,

tity, by its hardnefs: the filver is not fo eafily detected in it. Native gold is fometimes found in pure maffes of confiderable fize, many having been found of more than a pound weight: thefe maffes are met with in the gold mines, and are called aurum obryzum, or obryzium, but they are very rare: fuch, however, have been fometimes found in the german mines. See the article MINE.

Its more common appearance, in its more loofe ftate, is in form of what is called gold-duft: this is native gold in fmaller maffes, ufually indeed very fmall, mixed among the fands of rivers. This is found in many parts of the world, but the greateft quantity of it is from Guinea: fome of it is to be met with in the beds of fome of the rivers in Scotland. Native gold, in a middle ftate as to fize between thefe two kinds, is alfo found in the clifts or perpendicular fiffures of the folid ftrata in the mountains of Chili. Thefe fiffures are filled up partly with reddifh marle, partly with native gold immerfed in a debafed cryftalline ftone, of a bluifh hue; and partly with loofe native gold, which is ufually found in flat pieces, from the fize of a pea to that of a horfe-bean: the quantity however, fo far as has been yet difcovered, is not great.

Thefe, though not unfrequent in thofe parts of the world where there is gold, are, however, far from being its moft common appearance; for it is generally and in the greateft abundance found bedded in maffes of hard ftone, which lie at vaft depths; being often dug at a hundred and fifty fathoms: there is no peculiar ftone in which the gold is found in thofe places, but it is met with indifcriminately in feveral kinds; fome foft, fome harder, and even in earths. The richeft maffes are ufually of a whitifh, and fomewhat bright, but opake ftone, which is a debafed cryftal, containing a large quantity of a white earth: this is often tinged in part alfo with black, and fometimes with other colours: yet thro' all the different ftains the nature and texture of the ftone may be eafily difcovered to be the fame; and often the whole variety of colours will be found in one mafs. In this ftone, the gold lies in a very beautiful form, and a great variety of figures; fome parcels of it are varioufly divaricated, or in form of fmall branched figures, but thefe are very rare. Others are varioufly interwoven in narrower, or broader veins; and others in fmall flat fpangles, intermixed with fpecks of black: the ftone in which this is lodged will very readily give fire with fteel, and will not at all ferment with aqua fortis.

Befides this, however, there are many other ftones in the mines of Peru, which hold confiderable quantities of gold, vifible in large or fmaller fpecks; and thefe are of all colours, but ufually white or reddifh: the gold in thefe is ufually in fmall fpangles, but there is no certainty either in the fize of the maffes of pure native gold in this, or any other ftate; that of the coafts of Guinea, ufually called gold-duft, and commonly finer than the fmaller fands, yet fometimes affords pieces of three or four ounces weight; and the lumps of aurum obryzum, as it is called, have been found between twenty and thirty pound weight: thefe things, however, are not common.

Properties of GOLD. The chemifts tell us, that gold is compofed of two fubftances; the one an extremely pure and fimple matter, of the nature of mercury, and the other, which, they fay, fixes or deftroys the fluidity of this, an equally pure and fimple fubftance, extremely fubtile, and of the nature of fulphur. We are not, fays Dr. Hill, to take all this upon the credit of thofe who affirm it; for by all the trials that have been made, gold feems the moft fimple of all fubftances. It is the heavieft of all known bodies; and it is the moft ductile of all the metals. See the articles GRAVITY and DUCTILITY.

It is wholly incapable of ruft, and is not fonorous when ftruck upon. It requires a ftrong fire to melt it, remaining unaltered in the degree of heat that fufes tin or lead, but running with a lefs vehement one than is neceffary to the fufing of iron, or copper. It does not retain its colour, till the time of its melting, but becomes ignited and white, before it runs, and when in fufion it appears of a pale, bluifh, green colour on the furface. It amalgamates the moft readily of all the metals with quickfilver. When in a ftate of fufion, it very eafily, and very intimately blends itfelf with filver, and when mixt with that metal, will alfo run into a mafs with iron. Either filver or gold may indeed be mixed fingly with this metal, by fufion, but it is much more eafily done with regard to gold, when before blended with filver. It much more eafily mixes with copper, and the

the other metals; and very readily with some of the semimetals, as with the regulus of antimony: common fire carried to its utmost vehemence, has no further effect on gold than the fusing it. It will remain ever so long in its fiercest heat, and come out at last unaltered, and with its whole weight. Exposed to the focus of the strongest burning-glasses, it sparkles and flies off in small masses, which if recovered on paper, and examined afterwards, are found to be pure unaltered gold; but if the heat be managed very nicely, and the same gold again and again exposed to it, it is affirmed that a part of the gold will at length go off in fumes, and the remainder will be found to be a substance of a deep blue, with some admixture of purple; and approaching to the nature of vitriol, rather than of gold, of which it wants the malleability, and the specific gravity.

The proper solvent of gold is aqua regia: this menstruum owes its power upon this metal to the sea salt it contains; that being almost the only salt which has the quality of acting upon gold. The effect of this menstruum affords us one test for this metal; if we require another, we may have recourse to a fusion with antimony: for if pure gold and antimony be blended together, the antimony upon keeping up the fire to a great height will be driven off in fumes, and will leave the gold, if pure, unaltered in weight; whereas, if it contained any mixture of another metal, the antimony would have taken it away with it, not excepting even silver itself. See the articles AQUA REGIA and ANTIMONY.

If a quantity of salt of tartar, or any other fixed alkali, be thrown into a solution of gold, the metal is precipitated in form of a powder, which has an explosive power greater than that of gunpowder, or the pulvis fulminans of the chemists. This powder, from its property, is called aurum fulminans. See the article AURUM.

Gold is greatly the most divisible of all bodies. If melted with a hundred thousand times its weight of silver, it will perfectly and equally blend itself with that metal: any grain of the melted mass being cut off, will be found on assaying, to contain its due and proportionate quantity of the gold in it; and a single drop of a solution of gold in aqua regia, will communicate a metalline taste to a pint of spirit of wine, if mixed with it.

It is to be observed, that aqua regia, tho' the general and common solvent of gold, is not the only one. Hunkel long since discovered, that it might be dissolved by the fumes arising from a mixture of oil of tartar, and oil of vitriol; and a menstruum in the common liquid form, may be produced from these which will have the same power. Mercury also is a true solvent of this metal by amalgamation; and the hepar sulphuris, or liver of sulphur, on being fused with it, takes it up so perfectly, that it will be carried into a lac sulphuris, either in the solution or precipitation. See AMALGAMATION.

The chemical character to express gold is a circle with a point in the center thus, ☉. They intend this as a symbol of perfection and simplicity: the circle being the most uniform of all figures; and comprehending the greatest space under the smallest superficies. See the article CHARACTER.

Numberless have been the attempts to convert other metals into gold; but as nothing is so hard to communicate by art as gravity, they are hitherto, and are likely always to be without success. See the article PHILOSOPHER'S STONE.

The degradation of gold seems as highly difficult as the making it: some industrious people have gone so far towards this, as to bring gold to a state in which no reducing fluxes they were acquainted with, could restore it again: but this is no proof that others might not have been invented that would have done it. The vapour of phosphorus, indeed, in a manner calcines gold into a sort of unmalleable matter of the appearance of a calx; and the same thing may be done by a long and gentle calcination of gold, that has been amalgamated with mercury: but people are able to reduce gold in this state, produced by either means, into pure malleable gold again.

Method of imitating GOLD. Dr. Shaw thinks the following method of Mr. Homberg, for treating copper with quicksilver, preferable in imitating gold for the making watches, buckles, cane-heads, snuff-boxes, *&c.* to any other.

If an amalgam be boiled in river-water for two hours; and then the quicksilver be distilled off, and cohobated once; then the remaining copper, being now fused, will be of a beautiful gold colour, and more ductile than copper, so as to become well

well fitted for watchwork, gilding, and the finer machines and utensils. See the article AMALGAM.

For the methods of separating and refining GOLD, see the articles ASSAYING, COPPELLING, CEMENTATION, DEPART, REFINING, ORE, and WASHING.

GOLD, in medicine. The virtues of gold in medicine, however highly extolled by some writers, seem altogether imaginary. The Greeks never paid much respect to it in this way. Geoffroy tells us, that they never used it in medicine at all; but he seems mistaken, for Dioscorides prescribes the filings of this metal to those who had swallowed mercury. It first got footing as a medicine among the Arabians, and we find them prescribing it to be beat into thin leaves as an ingredient in many of their compositions. They tell us, that it is a cordial, and that it has great virtues against palpitations of the heart, nervous complaints, and melancholy. The chymists go farther, and talk of aurum potabile as an universal medicine: but there seems no great credit to be given to any thing that has been said upon this head; and the present practice allows its use as an ornament only to medicines, not as a medicine itself: the only preparation of it that has been received on the footing of a medicine by rational people, is the aurum fulminans, and that has been of late proved to be a very mischievous one. For this, and the other preparations of gold, see the article AURUM.

GOLD-WIRE, a cylindrical ingot of silver, superficially gilt, or covered with gold at the fire, and afterwards drawn successively through a great number of little, round holes, of a wire-drawing iron, each less than the other, till it be sometimes no bigger than a hair of the head. See the article WIRE.

It may be observed, that before the wire be reduced to this excessive fineness, it is drawn through above an hundred and forty different holes, and that each time they draw it, it is rubbed afresh over with new wax, both to facilitate its passage, and to prevent the silver's appearing through it.

GOLD-WIRE *flatted*, is the former wire flatted between two rollers of polished steel, to fit it to be spun on a stick, or to be used flat, as it is without spinning, in certain stuffs, laces, embroideries, *&c.*

GOLD THREAD, or SPUN GOLD, is a flatted gold, wrapped or laid over a thread of silk, by twisting it with a wheel and iron bobins.

Manner of forming GOLD-WIRE, *and* GOLD THREAD, *both round and flat.* First, an ingot of silver, of twenty-four pounds, is forged into a cylinder, of about an inch in diameter: then it is drawn thro' eight or ten holes, of a large, coarse wire-drawing iron, both to finish the roundness and to reduce it to about three-fourths of its former diameter. This done they file it very carefully all over to take off any filth remaining on the forge; then they cut it in the middle; and thus make two equal ingots thereof, each about twenty-six inches long, which they draw through several new holes, to take off any inequalities the file may have left, and to render it as smooth and equable as possible.

The ingot thus far prepared, they heat it in a charcoal fire; then taking some gold leaves, each about four inches square, and weighing twelve grains, they join four, eight, twelve, or sixteen of these as the wire is intended to be more or less gilt; and when they are so joined, as only to form a single leaf, they rub the ingots reeking hot with a burnisher. These leaves being thus prepared, they apply over the whole surface of the ingot, to the number of six, over each other, burnishing or rubbing them well down with the blood-stone, to close and smoothe them. When gilt, the ingots are laid anew in a coal fire; and when raised to a certain degree of heat, they go over them a second time with the blood-stone, both to solder the gold more perfectly, and to finish the polishing. The gilding finished, it remains to draw the ingot into wire.

In order to this, they pass it through twenty holes of a moderate drawing iron, by which it is brought to the thickness of the tag of a lace: from this time the ingot loses its name, and commences gold wire. Twenty holes more of a lesser iron leaves it small enough for the least iron; the finest holes, of which last scarce exceeding the hair of the head, finish the work.

To dispose the wire to be spun on silk, they pass it between two rollers of a little mill: these rollers are of nicely polished steel, and about three inches in diameter. They are set very close to each other, and turned by means of a handle fastened to one of them, which gives motion to the other. The gold

wire

wire in paffing between the two, is rendered quite flat, but without lofing any thing of its gilding, and is rendered fo exceedingly thin and flexible, that it is eafily fpun on filk thread, by means of a hand wheel, and fo wound on a fpool or bobin.

Gold-leaf, or Beaten gold, is gold beaten with a hammer into exceeding thin leaves, fo that it is computed, that an ounce may be beaten into fixteen hundred leaves, each three inches fquare, in which ftate it takes up more than 159052 times its former furface. See the article Ductility.

This gold they beat on a block of black marble, about a foot fquare, and ufually raifed three feet high: they make ufe of three forts of hammers, formed like mallets, of polifhed iron: the firft, which weighs three or four pounds, ferves to chafe, or drive; the fecond, of eleven or twelve pounds, to clofe; and the third, which weighs fourteen or fifteen pounds, to ftretch and finifh. They alfo make ufe of four moulds of different fizes, *viz.* two of vellom, the fmalleft whereof confifts of forty or fifty leaves, and the larger of two hundred: the other two, confifting each of five hundred leaves, are made of bullocks guts well fcoured, and prepared. See the article Mould.

Method of preparing and beating Gold. They firft melt a quantity of pure gold, and form it into an ingot: this they reduce, by forging, into a plate about the thicknefs of a fheet of paper; which done, they cut the plate into little pieces about an inch fquare, and lay them in the firft or fmalleft mould to begin to ftretch them: after they have been hammered here a while with the fmalleft hammer, they cut each of them into four, and put them into the fecond mould, to be extended further.

Upon taking them hence, they cut them again into four, and put them into the third mould, out of which they are taken, divided into four, as before, and laid in the laft, or finifhing mould, where they are beaten to the degree of thinnefs required.

The leaves thus finifhed, they take them out of the mould, and difpofe them into little paper books, prepared with a little red bole for the gold to ftick to; each book ordinarily contains twenty five gold leaves. There are two fizes of thefe books; twenty-five leaves of the fmalleft only weigh five or fix grains, and the fame number of the largeft, nine or ten grains.

It muft be obferved, that gold is beaten more or lefs, according to the kind or quality of the work it is intended for; that for the gold wire-drawers to gild their ingots withal, is left much thicker than that of gilding the frames of pictures, &c. withal. See Gilding.

Gold-finch, in ornithology, the englifh name of a fpecies of fringilla, with the wings variegated with black, yellow, and white. See the article Fringilla.

The common gold-finch is a very elegantly coloured bird, fomewhat fmaller than the common fparrow. But befides this, there are feveral other fpecies, as the Greenland gold-finch, with a black fpotted head, about the fize of the common linnet; and the greenifh yellow gold-finch, nearly of the fize reprefented in plate CXIX. fig. 1.

This laft is a moft elegant bird; the fore-part of its head, and the upper part of the throat being covered with fine fcarlet-coloured feathers, the top of the head afh-coloured, and the upper part of the body a yellowifh green.

Gold coin. See the article Coin.

Wafhing of Gold-ore. See the article Washing *of Ore*.

Gold-size. See the article Size.

Gold-smith, or as fome choofe to exprefs it, *filver-fmith*, an artift who makes veffels, utenfils, and ornaments in gold and filver.

The goldfmith's work is either performed in the mould, or beat out with the hammer, or other engine. All works that have raifed figures, are caft in a mould, and afterwards polifhed and finifhed: plates, or difhes, of filver or gold, are beat out from thin flat plates; and tankards, and other veffels of that kind, are formed of plates foldered together, and their mouldings are beat, not caft.

The bufinefs of the goldfmiths formerly required much more labour than it does at prefent; for they were obliged to hammer the metal from the ingot to the thinnefs they wanted: but there are now invented flatting-mills, which reduce metals to the thinnefs that is required, at a very fmall expence. The goldfmith is to make his own moulds, and for that reafon ought to be a good defigner, and have a tafte in fculpture: he alfo ought to know enough of metallurgy, to be able

able to assay mixed metals, and to mix the alloy.

The goldsmiths in London employ several hands under them for the various articles of their trade: such are the jeweller, the snuff-box and toy-maker, the silver turner, the gilder, the burnisher, the chaser, the refiner, and the gold-beater.

Goldsmiths are superior tradesmen: their wares must be assayed by the wardens of the company of this name in London, and marked: and gold is to be of a certain touch. No goldsmith may take above one shilling the ounce of gold, besides what he has for the fashioning, more than the buyer may be allowed for it at the king's exchange; and here any false metal shall be seized and forfeited to the king. The cities of York, Exeter, Bristol, *&c.* are places appointed for the assaying wrought plate of goldsmiths; also a duty is granted on silver-plate of six pence an ounce, *&c.* Plate made by goldsmiths, shall be of a particular fineness, on pain of forfeiting 10 l. and if any parcel of plate sent to the assayers is discovered to be of a coarser alloy than the respective standards, it may be broke, and defaced; and the fees for assaying are particularly limited.

Burnished GOLD, that smoothed or polished with a burnisher. See the articles BURNISHER, and BURNISHING.

Mosaic GOLD, that applied in pannels, on proper ground, distributed into squares, lozenges, and other compartments, part whereof is shadowed to heighten, or raise the rest. See the article MOSAIC.

Shell-GOLD, that used by the illuminers, and wherewithal we write gold letters. It is made of the pareings of leaf-gold, and even of the leaves themselves, reduced into an impalpable powder, by grinding on a marble with honey. After leaving it to infuse some time in aqua fortis, they put it in shells, where it sticks. To use it they dilute it with gum-water, or soap-water.

Pure GOLD, that purged by fire of all its impurities, and all alloy. See ALLOY. The moderns frequently call it gold of twenty-four caracts, but in reality there is no such thing as gold so very pure, and there is always wanting at least a quarter of a caract. Gold of twenty-two caracts, has one part of silver, and another of copper; that of twenty-three caracts has half a part, *i. e.* half a twenty-fourth of each. See CARACT.

Standard value of GOLD *coin*. See COIN.

GOLD, in heraldry, is one of the metals, more usually called by the french name *or*. See the articles METAL and OR.

Laws relating to GOLD *manufactures*. Gold and silver beaten, wrought in papers, for the printers, are prohibited to be imported by 1 Richard III. Gold and silver thread, lace, fringe, or other works made thereof, are prohibited to be imported by the 10th of Anne. Upon oath, that the goods were actually made after the first of July, 1712, of plate, wire-spun upon silk, and security given that they shall not be relanded in Great-Britain, *&c.* the exporter of gold lace, thread, and fringe, is to have the following allowance, *viz.* gold lace, thread, or fringe, the pound weight averdupois, 6 s. 8 d.

GOLDEN, something that has a relation to gold, or consists of gold, is valuable, or the like; as,

GOLDEN-BULL. See the article BULL.

GOLDEN-CALF, in jewish antiquity, a figure which the Israelites cast in gold, and set up in the wilderness to worship during Moses's absence in the mount, and which that legislator, at his return, burnt, ground to powder, and mixed with the water the people were to drink of; as in Exod. xxxii.

GOLDEN-EYE, in ornithology, *Clangula*. See the article CLANGULA.

GOLDEN-FLEECE, in the antient mythology, the skin, or fleece, of the ram upon which Phryxus and Hella are supposed to have swam over the sea to Colchis; which being sacrificed to Jupiter, its fleece was hung upon a tree in the grove of Mars, guarded by two brazen-hoofed bulls, and a monstrous dragon that never slept; but was at last taken and carried off by Jason, and the Argonauts.

Order of the GOLDEN FLEECE. See the article FLEECE.

GOLDEN-NUMBER, in chronology, a number shewing what year of the moon's cycle any given year is. See CYCLE.

From what has been said under cycle of the moon, it appears that the golden number will not shew the true change of the moon for more than three hundred and twelve years, without being varied. It is to be observed, that the golden number is not so well adapted to the Gregorian as to the Julian calendar; the epact being more certain in the new style, to find which, the golden number is of use. See the article EPACT.

The rule for finding the golden number is

is already given under CYCLE *of the moon*, or *lunar* CYCLE, of which rule take this example for the year 1754

Add 1

19)1755(92
171
45
38
7 Golden N°.

GOLDEN-ROD, *solidago*, in botany. See the article SOLIDAGO.

GOLDEN-ROSE. The pope annually consecrates a golden-rose on the fourth Sunday in Lent, which is sent to princesses, or to some church, as a mark of his peculiar affection.

GOLDEN-RULE, in arithmetic, is also called the rule of three, and the rule of proportion. See PROPORTION, and RULE OF THREE.

GOLDINGEN, a city of Poland, in the dutchy of Courland, sixty miles west of Mittau: east long. 22°, and north lat. 57°.

GOLNAW, a city of Brandenburg-Pomerania, fifteen miles north-east of Stetin; east long. 15°, north lat. 53° 40′.

GOLPS, in heraldry, are roundles of a purple tincture, called by the French torteaux, adding their peculiar colours.

GOLTBERG EARTH, *goltbergensis terra*, a species of bole. See BOLE.

GOMBRON, the greatest sea-port town in Persia, situated on the strait at the entrance of the gulph of Persia, opposite to the island of Ormus: east long. 55° 30′, north lat. 27° 30′.

GOMERA, one of the Canary-Islands, subject to Spain, and situated west of Teneriff: west long. 18°, north lat. 28°.

GOMORRAH-ISLANDS, situated between 10° and 13° south lat. on the eastern coast of Africa.

GOMPHOSIS, γόμφωσις, in anatomy, a species of articulation, wherein one bone is set in the other, like a nail or peg; as the teeth within the jaws. See the article ARTICULATION.

GOMPHRENA, the PURPLE EVERLASTING FLOWER, in botany, a genus of the pentandria-digynia class of plants, the flower of which is divided into five parts, and erect: the petals are subulated and permanent: the fruit is a thin, roundish crust, with one cell, in which are contained a single, large, roundish seed, with an oblique end. It is a native of both East and West-Indies; and the flower is usually of a beautiful purple colour.

GONAGRA, among physicians, signifies the gout in the knee. See GOUT.

GONARCHA, in antiquity, a dial delineated on several surfaces, or planes, some horizontal, others erect, oblique, *&c.* See the article DIAL.

GONDOLA, in naval architecture, a flat kind of boat, very long and narrow, chiefly used on the canals at Venice.

GONDOLA-SHELL, in natural history, a species of dolium, with an extremely wide mouth. See DOLIUM.

GONFANON, or GONFALON, a kind of banner, carried in the processions of the principal churches at Rome.

GONGER, in ichthyology, the same with conger. See the article CONGER.

GONORRHOEA, in medicine, an involuntary efflux of the seminal juices, and some other recrementitious matter.

Authors take notice of three species of gonorrhœas; the first is a simple gonorrhœa, or perpetual efflux of the seminal juices, without any virulence: the second is a venereal, or virulent gonorrhœa, so called, though improperly, from its similitude to the preceding: the third is an involuntary efflux of a viscid white, or whitish fluid from the urethra, in consequence of a venereal gonorrhœa ill cured, or too frequently repeated.

The first species of this disorder arises from a want of a due tone in the solid parts, and by a preternatural relaxation of the vessels containing the seed, and of the parts adjacent to them. See GLEET. This gonorrhœa is either mild or benign, or of a malignant kind. The latter consists in a discharge of matter of various colours, accompanied with heat and exulceration; and in scorbutic, or cacochymic patients, as also those afflicted with the stone, this disorder is generally attended with a pain in discharging the urine, which in such patients, is of an acrimonious quality: but in a gonorrhœa of a mild or a benign kind, a whitish liquor all of one colour, is discharged without pain, heat, or exulceration; and frequently proceeds from a redundance of the seminal fluid, arising from high living in an unmarried state, or its acrimony in cacochymic, scorbutic, or arthritic patients, as well as from the weakness of, and want of due tone in the seminal vessels.

The cure of a benign gonorrhœa is highly

ly difficult; nor can any other reaſon be aſſigned for this diſorder, than that there is a preternatural efflux of impure humours from all parts of the body to thoſe parts infected, which are already too much weakened, and have their tone deſtroyed. Beſides, the parts ſubſervient to generation, which are in this diſorder affected, conſiſt entirely of nerves and nervous coats; and it is not without the greateſt difficulty that the energy of medicines penetrates to them. In the cure, the following intentions are to be purſued. Firſt, the redundance of impure ſerum, if there are any ſuch in the body, is, by means of proper laxatives, to be evacuated and derived from the parts affected. Then the too much relaxed and flaccid parts are to be ſtrengthened by proper corroborating medicines, both of the external and internal kind. The former of theſe intentions is anſwered by ſuch laxatives as operate in a double manner, ſuch as the pilulæ balſamicæ of Becher, which are not only purgative, but highly corroborating. To anſwer the other intention, the following powder muſt be uſed. Take of cuttle-bone one ounce; of red coral, amber, the ſpecies of hyacinth, and the bark of caſcarilla, each two drams; make into a powder, one dram of which is to be taken every morning and evening in a decoction of barley, prepared with ſome almonds. At the ſame time the following epithem may be applied to the region of the pubes and perinæum, eſpecially during the night-time. Take of herbs, baum, mint, and baſil; of the leaves of red roſes, and baluſtins, each one handful; of pomgranate-bark, cloves, nutmegs, cardamoms, and maſtich, each half an ounce: mix together, and put into a ſmall bag to be boiled in red French wine. Theſe meaſures are to be ſeconded by an accurate regimen, being chiefly ſuch as is preſcribed below for the virulent gonorrhœa. In the cure of a malignant gonorrhœa, regard is to be had to the conſtitution of the patient: when he is hot, and of a delicate conſtitution, he ought, eſpecially in the beginning of the diſtemper, to abſtain from hot ſubſtances, purgatives, ſudorifics, diuretics, &c. The following preparation may be frequently exhibited in this diſorder. Take of mint, three handfuls; of venice turpentine, one ounce; of peruvian balſam, half an ounce; diſtil with three pints of rheniſh wine. The doſe is from one to two ounces: and the following may be uſed as a ſuccedaneum. Take of roſe-water, and rectified ſpirit of wine, each half a pint; and of the balſam of life, fifty drops. Mix all together.

A virulent gonorrhœa, or clap, being the ſecond ſpecies of this diſorder, proceeds from impure coition with an infected perſon.

This diſtemper begins, and makes its progreſs in the following manner.

The patient, ſooner or later, according as the perſon with whom he has had converſation, was more or leſs infected, and according to his conſtitution, by which he may be more or leſs diſpoſed to receive the infection, is firſt ſeized with an unuſual pain in the genitals; and a kind of ſenſation like a rotation of his teſticles. Afterwards, if the prepuce conſtantly covers his glans, there appears an eruption, or puſtule, which, by its ſize, colour and figure, reſembles a ſpot of the meaſles. Preſently after appears a weeping matter like ſemen, which daily changes colour, and becomes more purulent, and more yellow, till, at length, if the diſorder be highly virulent, it aſſumes a greeniſh hue, or appears like a thin ſanious matter, mixt with blood. The puſtule at length becomes an ulcer, called a ſhanker. See SHANKER.

Thoſe whoſe glans is uncovered, ſeldom have ſuch a puſtule, and are leſs liable to imbibe the infection. The running brings on a heat, or ſmarting in making water, which is moſt violent, when it is over, for then it ſeems to burn the whole duct of the urethra.

Another ſymptom is the cordee, or contraction of the frænum, by which the penis is bent downwards. There is likewiſe, when the penis is erected, great pain, as if compreſſed tranſverſely with a ſtrong hand. This chiefly happens in the night, when the patient is warm in bed: ſometimes the urethra being eaten, and excoriated with long running of acrimonious pus, nature breeds a ſoft ſpungy fleſh, to ſupply the defect, which daily increaſing, forms caruncles, or carnoſities ſo far as to plug up the urinary paſſage, and ſtop up the urine. However, the little adjoining ulcers continue to pour forth a kind of an ichor. It alſo happens, through ſome violent motion, or the ill-timed uſe of aſtringents, that the ſanies, which ſhould be carried off by

 the

the gonorrhœa, is tranflated to the fcrotum, and caufes one or both of the tefticles to fwell, and inflame with intolerable pain: the running at the fame time decreafing, while the fcalding of the urine is as great as ever.

To thefe fymptoms may be added the phimofis, and the paraphimofis. There are alfo fometimes watery bladders, called cryftallines, and at length buboes of the glands in the groin. See PHIMOSIS, PARAPHIMOSIS, BUBO, and POX.

Women are not fo fubject to fuch a variety of fymptoms as men: their chief complaint being a difficulty of urine, and a running; however they are liable to fhankers and venereal warts, as well within as on the outward parts of the labia pudendi; as alfo to buboes in the groin: as for the coarctation of the fphincter vaginæ, purfing as it were the external orifice, this is not a phimofis, though by fome improperly fo called.

This diforder proceeding from an infection of a malignant gonorrhœa, or the lues venerea, is firft conveyed to the genitals, and afterwards thro' the pores to the lymph, or feminal liquor; the due crafis and natural mixture of which it deftroys, by inducing partly a cauftic and corroding, and partly a putrid ftate thereof: Hence arife the pains, the heats, the tumours, the inflammations, and the exulcerations of the genitals. For at firft the glans only is infected whilft in coition, the poifion infinuating itfelf into the pores; after which, it foon proceeds to the glans of the urethra, then to the proftatæ, and afterwards to the veficulæ feminales. The regimen, during the time of the cure, according to Boerhaave, requires the patient to abftain from all oily food; and he muft alfo avoid every thing, which by its acrimonious quality ftimulates to venery; fuch as fpices, bulbous roots, flefh, eggs, fifh, and fermented liquors: for as the inflation of the penis retards the cure, it is of the utmoft confequence to be avoided; as are alfo every thing elfe that inflames the fancy or provokes to venery, as amorous dalliance with women, &c. Water and whey are the beft drink; and feeds and fummer fruits the beft aliment. All poffible care muft be taken that cold never reach the penis, and that it be kept always moift, left the pores contracting repel the flux of matter. An emollient and fomewhat antifeptic cataplafm will be beneficial. In the cure, Sydenham's method of purging the patient till the fymptoms were abated is now juftly laid afide. Turner's laft method, which he made ufe of himfelf, is as follows: Take two drachms of quickfilver; one drachm of gum guaiacum; and beat them, together with a little fpirit of lemon, till the globules of the mercury difappear: afterwards add half a drachm of the pills of colocynth with aloes: beat it into a mafs; of which make up twenty-four pills. Two of thefe pills containing half a fcruple of the mercury, may be taken night and morning; or according to the operation; one only for a week or ten days, unlefs the patient complains of his gums, or a fore mouth; for then the mercury muft be left out.

If the cordee does not remit, a fcruple of fal prunella may be taken, with as much fine fugar between whiles, in a draught of the following apozem: Take of mercurial water two pounds; of the folution of gum arabic, and fyrup of marfhmallows, each one ounce; make it into an apozem, or decoction. The mercurial water is common river-water, in two quarts of which four ounces of quickfilver have been boiled to a quart. The patient may drink of the apozem through the whole courfe.

And now, as there is occafion, the pills are continued for a week, or ten days more, but at night only; and in the morning is given the quantity of a nutmeg of the following electuary: Take virgin-honey, an ounce and a half; balfam of capivi, fix drachms; powder of the root of jalap, and fal prunella, of each one drachm, which make into an electuary. The patient muft drink a draught of the apozem as well after the electuary as after the pill. See the article ELECTUARY.

There is no danger of the running being ftopt while his body is kept open by thefe means; but when the quantity grows lefs, and the colour whiter and feels more tenacious, the pill is laid afide, and the electuary kept to fome days longer, night and morning. If it purges too much, the jalap is left out, and the rhubarb fubftituted inftead thereof. When it proves tedious, boiled turpentine is given by way of farther agglutinating, and drying the gleet.

When the cordee and dyfury, are very ftubborn

ſtubborn, or the running more virulent than ordinary, the genitals are to be ſmeared every night quite up to the groin, with the weaker blue ointment, and the pill without the quickſilver is given early in the morning in a large doſe, or a draught of the infuſion of ſenna. This method will ſucceed in three weeks, or a month's time, if the patient is governable.

In the place of mercurials given internally, Aſtruc directs the uſe of crude quickſilver, as in the common unction, to be rubbed upon the parts, as about the body of the penis, eſpecially under the urethra, to the perinæum, and ſo up to the pubes and teſticles, by which the mercury, inſinuating itſelf through the pores into the lymphatic veſſels, is inſtantly conveyed into the glandules and ſubdues the poiſon lodged therein, taking away all the ſymptoms without any diſturbance to the primæ viæ, the ſtomach and guts.

If there is no diſcharge from the penis of any virulent matter, it is called the gonorrhœa ſicca, or dry clap; the ſymptoms of which are a dyſury, or difficulty of making water, and after, from the increaſe of the inflammation and tumefaction, an iſchury, or total ſuppreſſion of urine. See the articles DYSURY, and ISCHURY.

In the cure of the dry clap, Aſtruc adviſes plentiful bleeding in the beginning, to take off the tenſion, and to abate the inflammation; as alſo emollient decoctions of mallows, linſeed, *&c.* in milk, to foment the parts: but perhaps it might be better to make a pultice of theſe ingredients, after Boerhaave's method, to lay to the parts affected; or, which is beſt of all, to uſe them one after the other.

Aſtruc adviſes alſo lenient clyſters, cooling emulſions, and ptiſans, with ſal prunella and anodynes, between whiles. During the continuance of the inflammation, no mercurials muſt be uſed, and if the ſymptoms increaſe, threatening an abſceſs in the perinæum, it is to be forwarded as much as poſſible, by ſuppurative pultices, and the matter diſcharged.

The ſymptoms of this diſeaſe being all ſeparately treated of under their ſeveral heads, for the cure and method of treating each, ſee the articles TUMOUR, BUBO, CARUNCLE, GLEET, SHANKER, PHIMOSIS, PARAPHIMOSIS, CRYSTALLINE, CONDYLOMA, CRISTÆ, *&c.*

When the gonorrhœa has continued a long while, or long enough for the poiſonous matter to make its way into the blood; or by aſtringents given unſeaſonably it cannot make its exit; then the patient is infected with the pox. See the article POX.

The third ſpecies of this diſorder requires the very ſame treatment with the ſimple and virulent: but here the leaſt time muſt not be loſt; the affected part muſt be kept in a conſtant ſtate of laxity, by the moſt emollient applications; and the contagious matter muſt with all poſſible expedition be drawn out: for the whole cure depends upon the total diſcharge of the infectious matter, together with the pus, which it has introduced; and if this taſk is not performed, a pox is greatly to be apprehended. Wherefore, if this diſeaſe continues but for a little time, recourſe muſt be had to all the ſeverities of a ſalivation. For though ſalivation does not at all cure either of the two former kinds of gonorrhœa, this ſpecies of the diſeaſe, having its ſeat in the glandulæ cowperianæ of the urethra, ſo that the pus diſcharges itſelf by their excretory duct into the urinary duct, is much more ſuſceptible of the power of mercury.

GOOD, in general, whatever is apt to cauſe or increaſe pleaſure, or diminiſh pain in us; or, which amounts to the ſame, whatever is able to procure, or preſerve to us the poſſeſſion of agreeable ſenſations, and remove thoſe of an oppoſite nature.

By pleaſure and pain, ſays Mr. Locke, I would be underſtood to mean of body or mind, as they are commonly diſtinguiſhed; though, in truth, they are only different conſtitutions of the mind, ſometimes occaſioned by a diſorder in the body, and ſometimes by thoughts of the mind. Pleaſure and pain, and their cauſes good and evil, are the hinges upon which our paſſions turn; ſo that by reflecting on the various modifications or tempers of mind, and the inteſtine ſenſations which pleaſure and pain, good and evil, produce in us, we may thence form to ourſelves the ideas of our paſſions. See PASSION, HAPPINESS, *&c.*

Metaphyſical GOOD, the ſame with perfection. See the article PERFECTION.

Moral GOOD, denotes the right conduct of the ſeveral ſenſes and paſſions, or their juſt

just proportion and accommodation to their respective objects and relations.

The same principle, or law of our natures, which determines us to pursue any one end, or species of good, prompts us to pursue every other end, or species of good of which we are susceptible, or to which our Maker has given us an original propension. But amidst the great multiplicity of ends or goods, which form the various ingredients of our happiness, we perceive an evident gradation, or subordination; and in the accommodation of our actions thereto, consists their moral goodness. Thus, the goods of the body, or of the external senses, seem to hold the lowest rank in this gradation or scale of goods. These we have in common with brutes; and when, at any time, they come in competition with goods of a higher order, the unanimous verdict of mankind gives the preference to these last. Next to sensual goods come those arising from social connections, as fame, fortune, power, civil authority, and the like, which are chiefly valuable, as being the means of procuring natural or moral good, but principally the latter. Goods of the understanding are still superior, as taste, knowledge, memory, judgment, &c. And the highest are the moral goods of the mind, directly and ultimately regarding ourselves, as command of the appetites and passions, prudence, fortitude, benevolence, &c. These are the principal ingredients of our happiness.

Moral good is of so singular and sublime a nature, that when the mind is in pursuit of it, though it should prove unsuccessful in its aims, it can rest in the conduct without repining, or being dejected at the ill success: nay, the pleasure attending the consciousness of upright aims, and generous efforts, absorbs the disappointment, and makes inferior ends disappear, as of no amount in the great aggregate or surplusage that remains. See the article HAPPINESS.

GOOD ABEARING, in law, denotes much the same with good behaviour.

GOOD BEHAVIOUR, in law, an exact carriage and behaviour to the king and his people.

A justice of peace may, at the request of another, or where he himself sees cause, demand surety for the good behaviour; and to that end the justice may issue out his warrant against any persons whatsoever, under the degree of nobility; but when it is a nobleman, complaint is to be made in the court of chancery, or king's bench, where such nobleman may be bound to keep the peace. Infants and feme-coverts, who ought to find surety by their friends, may be bound over to their good behaviour; as also lunatics, that have sometimes lucid intervals, and all others who break the peace, or being suspected to do it, by affrays, assaults, battery, wounding, fighting, quarrelling, threatning, &c. A person may be likewise bound to his good behaviour for a scandalous way of living, keeping bawdy-houses, gaming-houses, &c. and so may common drunkards, whoremongers, common whores, cheats, libellers, &c. He who demands surety for the peace, on any violence offered, must take an oath before the justice, that he goes in fear of his life, or some bodily harm, &c. and that it is not out of malice, but from a regard to his own safety.

GOODS, *bona*, in law, the same with chattels. See the article CHATTELS.

Consignment of GOODS. See the article CONSIGNMENT.

Running, &c. *of* GOODS. See the article RUNNING, &c.

GOOD-HOPE, or *Cape of* GOOD HOPE, the most southern promontory of Africa, where the Dutch have built a good town and fort: east long. 16° and south lat. 34° 15′.

GOOLE, in law books, signifies a breach in a sea-bank, or wall.

GOOSE, *anser*, in ornithology, a well known bird of the anas-kind, with the back of a greyish brown colour, the belly and edges of the wing-feathers white.

Geese are fowls of great profit, both for food, for their feathers, and for their grease. For the gathering of their feathers, some authors advise their being pulled twice a year, *viz.* in March and August; yet this is certainly an unprofitable as well as a cruel practice; for the goose on being incapable of flight, easily falls a prey to the fox, and other ravenous creatures, and by uncloathing her, you occasion her getting cold, which suddenly kills her. 'Tis therefore, most adviseable to stay till moulting time, or till you kill her, and then all her feathers may be made use of at pleasure.

GOOSE-

GOOSE-BERRY, *grossularia*, or *ribes*, in botany. See the article RIBES.

The best way of raising these useful bushes is by cuttings, observing always to take the handsomest shoots, and that from branches that bear most fruit. These are to be planted in February. See the article CUTTINGS.

There are a great many sorts of goose-berry, among which the white holland kind is the fairest, and best bearer of all others; the berries being large, transparent, and well tasted. The english yellow goose-berry is known every where, and fittest for culinary uses while green.

The hedge-hog goose-berry is large, well-tasted, and extremely hairy. There is also a sort of green goose-berry, that is a very pleasant fruit.

Goose-berries taken in season, produce a delicious wine, very proper for summer repasts. Also, if throughly pressed, with an addition of water, and well fermented, they yield in distillation the best brandy of any of our fruits, and little inferior to french brandy.

GOOSE-NECK, in a ship, a piece of iron fixed on the end of the tiller, to which the laniard of the whip-staff, or the wheel rope comes for steering the ship.

GOOSE-WING, in the sea-language. When a ship sails before, or with, a quarter-wind on a fresh gale, to make the more haste, they launch out a boom, and sail on the lee-side; and a sail so fitted, is called a goose-wing.

GOR, the capital of a province of the same name, in the East-Indies, subject to the Mogul: east long. 85°, north lat. 31° 15′.

GOR-COCK, a bird, otherwise called a moor-cock. See MOOR-COCK.

GORCUM, a city of the United Provinces, situated in that of Holland, on the river Waal, twenty-two miles east of Rotterdam: east long. 4° 50′, north lat. 51° 50′.

GORDIAN KNOT, in antiquity, a knot made in the leathers or harness of the chariot of Gordius, king of Phrygia, so very intricate, that there was no finding where it began or ended.

The inhabitants had a tradition, that the oracle had declared, that he who untied this knot, should be master of Asia. Alexander having undertaken it, was unable to accomplish it, when fearing lest his not untying it should be deemed an ill augury, and prove a check in the way of his conquests, he cut it asunder with his sword, and thus either accomplished or eluded the oracle.

GORE, in heraldry, one of the abatements, which, according to Guillim, denotes a coward. It is a figure consisting of two arch lines drawn one from the sinister chief, and the other from the sinister base, both meeting in an acute angle in the middle of the fess point. See plate CXI. fig. 2.

GOREING, in the sea-language, sloping. A sail is cut goreign, when it is cut sloping by degrees, and is broader at the clew than at the earing, as all top-sails and top-gallant sails are.

GOREL, the title of the prince of Georgia, in Asia. See the article GEORGIA.

GORGE, *gula*, in architecture, the narrowest part of the tuscan and doric capitals, lying between the astragal, above the shaft of the pillar and the amulets. See the articles TUSCAN and DORIC.

It is also used for a concave moulding, larger, but not so deep as a scotia, which serves for compartments, &c. See the article COMPARTMENT.

GORGE, in fortification, the entrance of the platform of any work.

In all the outworks the gorge is the interval betwixt the wings on the side of the great ditch, as the gorge of a ravelin, half-moon, &c. These, it is to be observed, are all destitute of parapets; because, if there were any, the besiegers having taken possession of the work, might use it to defend themselves from the shot of the place; which is the reason, that they are only fortified with pallisadoes, to prevent a surprize.

The gorge of a bastion is nothing else but the prolongation of the curtins from their angle with the flanks, to the center of the bastion where they meet. When the bastion is flat, the gorge is a right line, which terminates the distance between the two flanks. See the articles BASTION and FORTIFICATION.

GORGED, in heraldry, the bearing of a crown, coronet, or the like, about the neck of a lion, a swan, &c. and in that case it is said, the lion or cygnet is gorged with a ducal coronet, &c.

Gorged is also used when the gorge, or neck of a peacock, swan, or the like bird,

bird, is of a different colour or metal, from the reſt.

GORGED, among farriers, &c. ſignifies the ſame as ſwelled; in which ſenſe they ſay, the legs of a horſe are gorged; the paſtern joint is gorged; you muſt walk him out to diſgorge his ſhoulder.

GORGERIN, in architecture, the ſame with gorge. See the article GORGE.

GORGONA, the name of two iſlands, one in the pacific ocean on the coaſt of Peru: weſt long. 79°, north lat. 3°; the other in the Mediterranean, twenty-five miles weſt of Leghorn.

GORGONS, in antiquity, a warlike female nation of Lybia, in Africa, who had frequent quarrels with another nation of the ſame ſex, called Amazons.

GORITIA, or GORITZ, a town of Carniola, in Auſtria, near the confines of the territories of Venice: eaſt longitude 14°, north latitude 46° 20′.

GORLITZ, a city of Upper Saxony, in Germany, fifty miles eaſt of Dreſden: eaſt long. 15° 6′, north lat. 51° 12′.

GOSHAWK, the engliſh name of the yellow-legged falcon, with a brown back, and a white variegated breaſt. See the article FALCON.

It is a large and very beautiful bird, which preys upon the pheaſant, mallard, wild gooſe, hare, and coney, and will even venture to ſeize on a kid or goat. She ought to be kept with great care, as being very choice and dainty.

GOSLAR, an imperial city of Lower Saxony, in Germany, thirty miles ſouth of Brunſwic: eaſt longitude 10° 30′, north latitude 52°.

GOSPEL, the hiſtory of the life, actions, death, reſurrection, aſcenſion and doctrine of Jeſus Chriſt.

The word is ſaxon, and of the ſame import with the latin term *evangelium*, or the greek εὐαγγέλιον, which ſignifies glad tidings, or good news; the hiſtory of our bleſſed Saviour being the beſt news ever publiſhed to mankind.

This hiſtory is contained in the writings of St. Matthew, St. Mark, St. Luke, and St. John; who from thence are called evangeliſts. The chriſtian church never acknowledged any more than theſe four goſpels as canonical; notwithſtanding which, ſeveral apocryphal goſpels are handed down to us, and others are entirely loſt.

The antient fathers endeavoured to find out divers myſteries in their being but four genuine canonical goſpels. St. Jerom, in particular, ſays, that as there are four parts of the world, and four principal winds, it was alſo proper there ſhould be four goſpels in the church, as four columns to ſupport it, and four breathings of life to render it immortal. They thought they found the figure of the four evangeliſts in the beginning of the prophecy of Ezekiel, and in the ninth chapter of the Revelations, where mention is made of four living creatures, the firſt having the face of a man; the ſecond of a lion; the third of an ox; and the fourth of an eagle; and for this reaſon the evangeliſts are uſually painted with theſe ſymbols.

GOSSYPIUM, COTTON, in botany, a genus of the monadelphia-polyandria claſs of plants, the flower of which conſiſts of five plane and patent petals, growing together at their baſes, and vertically cordated: the fruit is a roundiſh capſule, containing four cells, with a great number of oval ſeeds, ſurrounded with a fine downy matter. See COTTON.

GOSTAVIN, or GOSTIVIN, a town of great Poland: eaſt long. 20°, north lat. 52° 45′.

GOTHA, the capital of the dutchy of Saxe-Gotha, in Upper Saxony: eaſt longitude 10° 36′, north latitude 51°.

It is ſubject to the duke of Saxe-Gotha, brother of her royal highneſs the princeſs dowager of Wales.

GOTHIC, in general, whatever has any relation to the Goths: thus, we ſay gothic cuſtoms, gothic architecture, &c. See the article ARCHITECTURE.

Gothic architecture is far removed from the manner and proportions of the antique; having its ornaments wild and chimerical, and its profiles incorrect. However, it is frequently found very ſtrong, and appears very rich and pompous, as may be ſeen in ſeveral of our engliſh cathedrals. This manner of building was, originally, very heavy and courſe; but is ſince run into the oppoſite extreme, being ſlender, rich, and delicate to a fault. In the gothic architecture, we ſee high vaults raiſed on ſlender pillars; and every thing crouded with windows, roſes, croſſes, figures, &c.

GOTHIC CHARACTER, or LETTER. See the article LETTER.

GOTHIC COLUMN. See COLUMN.

GOTHLAND, the moſt ſouthern province of Sweden, being a peninſula ſurrounded on three ſides by the Baltic Sea. It is ſubdivided into eaſt and weſt Gothland,

Smaland, Halland, Bleken and Schonen.

GOTHLAND, is alſo an iſland of the Baltic, ſituated between the province of Gothland and Livonia.

GOTTENBURG, a port-town of Sweden, ſituated without the Sound, on the coaſt of the Schaggerack Sea, near the entrance of the Baltic.

GOTTINGEN, a city of Germany, in the circle of Lower Saxony, and dukedom of Brunſwic: eaſt longitude 9° 45′, north latitude 51° 32′.

GOTTORP, a city of the dukedom of Sleſwic, in Denmark, and capital of the territories of the duke of Holſtein-Gottorp: eaſt long. 10°, north lat. 54° 40′.

GOUDE, a city of the United Netherlands, in the province of Holland, ten miles north-eaſt of Rotterdam.

GOUDHURST, a market-town of Kent, nine miles ſouth-weſt of Maidſtone.

GOVERNMENT, in general, is the polity of a ſtate, or an orderly power conſtituted for the public good.

Civil government was inſtituted for the preſervation and advancement of men's civil intereſts, and for the better ſecurity of their lives, liberties, and properties. The uſe and neceſſity of government is ſuch, that there never was an age or country without ſome ſort of civil authority: but as men are ſeldom unanimous in the means of attaining their ends, ſo their difference in opinion in relation to government, has produced a variety of forms of it. To enumerate them, would be to recapitulate the hiſtory of the whole earth. But they may, in general, be reduced to one of theſe heads: either the civil authority is delegated to one or more, or elſe it is ſtill reſerved to the whole body of the people; whence ariſes the known diſtinction of government into monarchy, ariſtocracy, and democracy. See ARISTOCRACY, DEMOCRACY, *&c.*

Mr. Hooker thinks, that the firſt government was arbitrary, and adminiſtered by a ſingle perſon; till it was found by experience, that to live by one man's will, was the cauſe of all men's miſery: and this, he concludes, was the original of inventing laws. The roman, and moſt of the grecian ſtates, were built upon the republican plan; but when the Goths, and other northern nations, deſtroyed the roman empire, and extended their conqueſts into far diſtant countries, they eſtabliſhed, wherever they came, a mixed form of government. The preſervation of this conſtitution depending upon the balance between the king, nobility, and people, the legiſlative power was lodged in theſe three ſtates, called by different names in different countries; in the north, diets; in Spain, cortes; in France, eſtates; and in Britain, parliaments. The excellency of this mixed government, conſiſts in that due poize or balance between rule and ſubjection, ſo juſtly obſerved in it, that by the neceſſary concurrence of the nobility and commons, in the making and repealing all laws, it has the main advantage of an ariſtocracy, and a democracy, and yet is free from the diſadvantages and evils of either of them. This mixed form of government is, however, now driven almoſt out of Europe, in ſome parts of which we can hardly find the ſhadow of liberty left, and in many, there is no more than the name of it remaining. France, Spain, Portugal, Denmark, and part of Germany, were all, an age or two ago, limited monarchies, governed by princes, well adviſed by parliaments or cortes, and not by the abſolute will of one man. But now all their valuable rights and liberties are ſwallowed up by the arbitrary power of their princes: whilſt we in Great Britain have ſtill happily preſerved this noble and antient gothic conſtitution, which all our neighbours once enjoyed. There is ſuch a due balance of property, power and dominion in our conſtitution, that, like the antient government of Sparta, it may be called an empire of laws, and not of men; being the moſt excellent plan of limited monarchy in the world.

Governments are commonly divided into two claſſes, arbitrary and free-governments; but there are many different ſorts of each. Thus the governments of France and Spain are generally called arbitrary; tho' they differ as much from the governments of Turky and other eaſtern empires, where abſolute deſpotiſm prevails, as they do from the government of England, and other european nations, where liberty is ſaid to flouriſh in its fulleſt perfection.

GOVERNMENT is alſo a poſt or office which gives a perſon the power or right to govern or rule over a place, a city, or province, either ſupremely or by deputation.

GOVERNMENT is alſo uſed for the city, country, or place to which the power of governing is extended. In France there are thirty-eight governments of provinces independent of each other; and beſides theſe there are twelve grand govern-

ments, which are those of the isle of France, Burgundy, Normandy, Guienne, Brittany, Champaign, Languedoc, Picardy, Dauphiny, Provence, Lyonois, and Orleanois: but these last are only so many classes of governors or governments, contrived for the better and easier regulating the seats, &c. of the many governors, bailiffs, provosts, &c. who are obliged to assist at the general estates.

GOVERNMENT, in grammar, a part of construction usually called regimen. See CONSTRUCTION and REGIMEN.

GOUGE, an instrument or tool used by divers artificers; being a sort of round hollow chissel, for cutting holes, channels, grooves, &c. either in wood or stone. See the article JOINERY.

GOURD, *cucurbita*, in botany. See the article CUCURBITA.

Gourd seeds are of the number of the four greater cold seeds. They are esteemed cooling and diuretic, and are used in emulsions, and some compositions of the shops. They are good in fevers, and in all disorders arising from an acrimony of the blood or humours. Emulsions of these, and the other cold seeds, are anodyne, and are generally used to take off stranguries occasioned by blisters.

We have our gourd-seeds from Holland. They should be chosen large and plump, fresh, and full of pulp, and of a good taste.

Bitter GOURD, a name given to the colocynthis. See the article COLOCYNTHIS.

Indian GOURD, the same with the crescentia of botanists. See CRESCENTIA.

GOURDY LEGS, in horses, the disorder otherwise called grease. See GREASE.

GOUST, or GOUT, signifies taste or skill in poetry, painting, &c.

GOUT, *arthritis*, in medicine, as defined by Boerhaave, a very painful disease, whose seat is in the joints and ligaments of the feet, and whose principal times of invasion are the spring and autumn.

This disease, according to the forementioned author, seldom invades any patient till he is upwards of thirty; and men are more subject to it than women; as also all persons of acute parts that follow their studies too close, especially in the night-time, with an intense application of mind. Likewise those who live high, and indulge their appetites; drinking plentifully of rich generous wines; or who use acids too freely, or white eager wines; or who have been addicted too early to venereal pleasures; or whose bodies are large, gross, and full. Those are liable to it whose sweaty feet are too suddenly chilled; or who suffer their feet to sweat in wet shoes and stockings. Hence hunting and riding in the cold are pernicious. It may likewise be received by contagion, and is hereditary, descending from father to son.

In treating of this disease we shall, from the authority of Sydenham, first give an account of what that writer calls the regular gout, and afterwards of what he calls the irregular: by the latter is meant a gout which, by the preposterous use of improper medicines, has been turned out of its natural course; or, by reason of the patient's weakness, cannot attain to its proper and genuine symptoms.

The regular gout makes its onset in the following manner. It usually seizes the patient in the latter end of January, or beginning of February, all of a sudden, without any previous notice, unless the patient has been troubled with crudities of the stomach, and indigestion for some weeks before: the body likewise, in many, seems to have been puffed up with wind, with a kind of heaviness, which daily increases, till at length the fit comes thundering on; a few days before which there is a torpor, and, as it were, a descent of wind down the muscles of the thigh, with a kind of spasmodic affection of them. Likewise the day before the fit, the appetite is more voracious, but not natural.

Though the patient seems to go to bed in good health, yet commonly about two in the morning, he is alarmed by a pain which most frequently affects the great toe, sometimes the heel, the ancle, or the calf of the leg, which pain resembles that of dislocated bones: there is likewise a sensation, as if water, almost cold, was poured on the membranes of the part affected. Soon after a shivering and shaking supervene, with a feverish disorder. The pain, which at first was tolerable, becomes more violent, as the shaking decreases, and grows more intense every hour till night; and then it is at the height, settling itself about the little bones of the tarsus and metatarsus, whose ligaments it affects. Now there seems to be a violent extension of the ligaments; or there is a sensation of their being lacerated: sometimes they seem to be pressed or squeezed together. At this time the parts affected become so exceeding sensible, that they cannot bear the weight of

of the sheet, nor the shaking of the room by a person walking about, unless he treads very softly. This always happens at the accession of the fit. About twenty-four hours after this, the patient perceives the part to be swelled, and the pain much abated.

The next day, or perhaps two or three days afterwards, if the gouty matter is copious, the part affected is a little in pain. In a few days, the other foot begins to be affected in the same manner; and if the pain has ceased in the first, the weakness which it left behind soon vanishes; the same tragedy is now acted over again. Sometimes when the gouty matter is in great plenty, it attacks both feet at once, but it generally seizes one after the other.

After both feet hath been tormented, the fits which follow are out of rule, both as to the time of invasion and the duration; only the pain grows more intense at night, and remits in the morning. From a series of those small fits arises what is called a fit of the gout, which is longer or shorter, according to the patient's age. This happens to the more vigorous, and whom the gout seldom visits, in fourteen days; to persons advanced in years, who have often felt its rage, two months: but those who are debilitated with age, or the long stay of the disease, it does not leave till summer; which being pretty far advanced, drives it away.

When the fit goes off, there is an intolerable itching in the affected foot, chiefly between the toes, from which, and from the feet, fall branny scales, as if the patient had swallowed poison: the disease thus terminated, the patient's good habit of body and appetite return in proportion to the severity of the pain in the last fit, and in the same proportion the next fit will be either accelerated or retarded: for if the last was very severe, the next will not come on in less time than a solar revolution.

Such is the regular gout and its genuine symptoms: but when it is disturbed by incongruous medicines, and the patient is worn out by the long continuance of the disease, it becomes irregular, and the substance of the body is as it were changed into a fomes of the disease, and nature becomes unequal to the task of conquering the disease thus changed in the accustomed manner.

The feet were at first the seat of the disease, but now it attacks the hands, wrists, elbows, knees, and other parts of the body: sometimes it so distorts the fingers, as to make them resemble a bunch of parsnips; and at length stoney concretions appear about the ligaments of the joints, which breaking through the skin, resemble chalk, or crab's eyes. Sometimes the gouty matter invades the elbows, and creates a whitish swelling of the size of an egg, which soon assumes a red colour, and becomes inflamed: sometimes it affects the thigh in such a manner, as if a great weight was hung thereon; and yet without any remarkable pain: from thence it descends to the knee, which it attacks more roughly, hindering all motion.

Now the gout afflicts the patient all the year, except for two or three months in summer; and the particular fit which did not last above a day or two, continues ten or fifteen days: the patient is disturbed with sickness as well as pain; his limbs begin to be contracted and unfit for motion; and if he attempts any exercise beyond his strength, the fomes of the disease will attack the viscera in a more dangerous manner.

The curative intention, according to Wintringham, requires, first, that the primæ viæ be set free from a load of indigested crudities, and the viscera be restored to their pristine vigour; secondly, that the fluid stagnating in, and stuffing up the smaller vessels, may be expelled the body, and a free passage through the contracted vessels be restored.

The first intention may be answered by vomits and gentle cathartics repeated as occasion requires; by bitters, aromatics, antiscorbutic medicines; by alkaline fixed salts, taken in small quantities for a long time; by aliments and drinks that are nourishing, light, easy of digestion, quickly assimulated, and taken in due quantity; by powerful exercise often repeated, and long continued; and especially by riding in a dry, serene, pure air; by frictions; by motion of the affected parts; by going to sleep at early hours.

The second intention may be answered partly by the preceding, as well as by procuring gentle sweats; by bathing in natural and artificial baths; by sweating in a bagnio; or by the use of volatile salts, and copious drinking of attenuating liquors, actually hot, in the morning while in bed, in order to procure a

ſweat; as alſo by mercurial purges, taking a large quantity of diluents after them; by frictions of the whole body, eſpecially the parts affected, with hot, dry, linen-cloths, till a redneſs appear; by cold baths, and the like.

To abate the exceſſive pain in the part affected, Boerhaave ſays, that if there be an abſolute neceſſity, opiates may be given internally, and the patient may drink plentifully of hot whey, or any other liquor of the like nature. Externally emollients and anodynes may be uſed, laid on pretty hot; or the part affected may be beat with nettles; or it may be anointed with terebinthinated balſam of ſulphur; or tow may be burnt thereon.

Sydenham ſays, that though there is nothing of any moment to be done in the fit; yet that it will be proper to abſtain from fleſh for ſome days, and to live on water-gruel, or ſuch-like diet, but no longer than the ſtomach is averſe to fleſh, for fear of bringing on a diſturbance of the animal ſpirits: but then great care ſhould be taken in the diet, both as to quantity and quality. See the article DIET.

Dr. Cheyne adviſes, that as ſoon as the pain is almoſt gone, and the ſwelling and weakneſs only remain, nothing can be better than warm ſtomachic and ſpicey purges, doſed and repeated, according to the ſtrength of the patient. This being premiſed, if the patient's ſtrength is impaired, and fleſh waſted, he adviſes aſſes milk with pearl, half a pint or a pint in the morning early, or at five or ſix o'clock in the afternoon; and to keep up the appetite which the milk commonly palls, and to prevent its cooling effects on the ſtomach, a light bitter made of gentian, cinnamon, and orange-peel, only the laſt double to the other two, infuſed in ſherry or white wine, and taken two hours before meals, may be uſed moſt conveniently.

Out of the fit, Sydenham preſcribes a medium of diet to be obſerved; the patient ſhould eat no more than the ſtomach will digeſt, nor ſhould he be ſo abſtemious as to defraud the parts of ſuch a proportion of aliments as is neceſſary to maintain their ſtrength and vigour. As to the quality of the food, the patient's palate is to be conſulted, but he ſhould dine upon one diſh of meat only; he ſhould, however, not eat any thing that is ſharp, ſalted, or ſeaſoned with ſpices: he ſhould eat no ſuppers, but inſtead thereof drink a draught of good ſmall-beer. The moſt ſuitable drink is ſuch as is not ſo ſtrong as wine, nor ſo weak as water: of this ſort is the London table beer, or water with a little wine; but when the gouty matter has ſeized the whole body, he muſt abſtain from all fermented liquors, though ever ſo mild and ſmall, and uſe the following decoction only. Take of the root of ſarſaparilla ſix ounces; ſaſſafras wood, china root, and the ſhavings of hartſhorn, each two ounces; liquorice root, an ounce; boil them together in two gallons of ſpring-water for half an hour. Afterwards infuſe them upon hot aſhes, cloſe covered for twelve hours: then boil them till a third part of the liquor is exhaled, and as ſoon as it is taken off the fire, infuſe therein half an ounce of aniſeeds for two hours. Laſtly, ſtrain it off and let it reſt till it become clear, and put it up into bottles for uſe.

Regard muſt likewiſe be had to the ſymptoms, which in the fit endanger the patient's life. The moſt common is a weak and languid ſtomach, attended with ſickneſs and gripes, as if from wind. In this caſe nothing is better than a glaſs of canary drank now and then, together with exerciſe; but if the ſymptom will not yield to this, give twenty drops of the thebaic tincture in ſpirituous alexiterial water, provided the head is not attacked, and let the patient compoſe himſelf to reſt. If the ſymptom will not yield to this, ſweating is preſcribed, as alſo in a diarrhœa, when laudanum fails: but if there is a tranſlation of the gouty matter to the lobes of the lungs, and the pain has left the joints, this ſymptom is to be treated as a peripneumony. See the article PERIPNEUMONY.

If the nephritic pains ſhould come upon the gout, let the patient omit all other medicines, and drink a large quantity of poſſet-drink, in which the leaves and roots of mallows and marſh-mallows have been boiled. Then let a clyſter be given, and afterwards a doſe of laudanum. When the gout has ſeized on the head, Dr. Cheyne orders it to be treated as any other violent head-ach, or an inflammation of the brain and its membranes. In young and ſtrong conſtitutions, mercurial and antimonial vomits will do wonders; likewiſe gentle ſtomach-purges are to be poured down continually, that is

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two or three spoonfuls every third-hour, till the effect is obtained. See the articles Head-ach and Vomit.

Pitcairn asserts, that the gout may be cured in the same manner as the lues venerea, by a salivation, and a decoction of the woods; and Cheyne allows, that a full and free salivation will cure the gout for several years, but then it shatters the constitution so much, that the future fits become worse for it: but however this is no objection against a common mercurial course, which Dr. James, after repeated trials, has found very efficacious in the cure of the gout, of which the several cases published in his treatise of the gout, are a sufficient testimony.

Cheyne likewise observes, that a dram of powdered sulphur, or flower of brimstone, taken regularly in a spoonful of milk, has prevented the fit for many years. It moves the body gently once or twice a day.

Musgrave, to bring the gout back from the noble parts to the joints, had a great opinion of the alcohol martis. See the article Alcohol.

If this does not excite a pain in the joints in four or five days, recourse must be had to externals; such as the cephalic plaster, ceratum viride, or hat-case; or the parts must be stung with nettles.

De Sault, supposing the gout depends on the want of perspiration, proposes warm baths, exercise, avoiding cold as much as possible, clean linen and other cloaths, moderate eating, abstinence from suppers, frictions, tranquillity of mind, and a milk diet, as preservatives against it. He recommends garlic in the summer, and steel and the peruvian bark in the winter. When the stomach is attacked, he lets blood at the ancles, and applies epispastics of different kinds to the feet; and then endeavours to procure a general sweat. When the pain is very violent, he blunts it by applying a cloth dipt in liquid laudanum, and exhorts the patient to use exercise after this.

Cheyne says, that mercurial vomits are not only proper for the gout in the stomach, but that they are absolutely necessary, as well as the mercurial purges, when the gout becomes fixed to and permanent in a part, as also when it is dispersed all over the habit like a rheumatism; that these active medicines must first render the humours fluid, which gum guaiac, with diaphoretic antimony, will afterwards carry off.

Gout-wort, in botany, a term sometimes used for angelica. See Angelica.

GOUTY-land, among farmers, denotes a moorish, cold and black soil, abounding with springs.

In Staffordshire this sort of land is ordered much in the same manner as heathy land, only that it is usually burnt deeper. It bears little but oats, white oats upon the gouty, and black oats upon the black cold land.

The turf of these grounds burnt, and carried upon rye or barley-lands, is esteemed a better improvement than dung.

GOWN, *toga*, a well known garment, worn by divines, lawyers, &c. who are therefore called gown-men, or gentlemen of the gown.

The citizens of antient Rome all wore gowns, *togæ*; whence the appellation given them of *gens togata*. See the articles Toga, Pretexta, &c.

GRABATARII, in church-history, a name antiently given to persons who deferred receiving of baptism, till on their death-bed.

GRABOW, or Grubow, a town of Lower Saxony, and dutchy of Mecklenburg: east longitude 11° 36′, north latitude 53° 32′.

GRACE, *gratia*, among divines, signifies any unmerited gift which God bestows on mankind.

Divines distinguish grace into habitual and actual: the first resides statedly in us, is fixed in the soul, and remains till it is expunged by some grievous wilful sin. This is also called justifying grace, as it makes us appear innocent and righteous in the sight of God; and sanctifying grace, as it makes us holy and devoted to God. Actual grace is that which God gives us for the special performance of some particular good thing, as to convert us, to enable us to resist a particular temptation, &c.

Grace is also divided into natural and supernatural: the natural including the gifts of being, life, of rational faculties, an immortal soul, &c. and the supernatural, is considered as a gift conferred on intelligent beings in order to their salvation.

Grace, in geography, a city of Provence, in France, fifteen miles south-west of Nice: east long. 6° 50′, north lat. 43° 40′.

Act of Grace, an act of parliament for a general and free pardon, and for setting at liberty insolvent debtors.

Days

Days of GRACE, in commerce. See DAY.

GRACE is alfo a title of dignity given to dukes, archbifhops, and in Germany, to barons and other inferior princes.

GRACE *of God*, or *By the Grace of God*, a formula ufed by fovereign princes, to exprefs their independence. Thus in fpeaking of his britannic majefty, the formula runs thus: "George, by the "grace of God, king of Great Britain, "*&c.*"

GRACES, *gratiæ*, among canonifts, the fame with provifions. See PROVISION.

GRACES, in heathen mythology, three goddeffes, whofe names were Aglia, Thalia, and Euphrofyne; that is, fhining, flourifhing, and gay; or, according to fome authors, Pafithea, Euphrofyne, and Ægiale. Some make them the daughters of Jupiter, and Eurynome, or Eunomia, the daughter of Oceanus; but the moft common opinion is, that they were the daughters of Bacchus and Venus.

They are fometimes reprefented dreffed, but more frequently naked, to fhew, perhaps, that whatever is truly graceful, is fo in itfelf, without the aid of exterior ornaments. They prefided over mutual kindnefs and acknowledgment; beftowed liberality, eloquence, and wifdom, together with a good grace, gaiety of difpofition, and eafinefs of manners.

GRACILIS, in anatomy, a mufcle of the leg, fo called from its flendernefs: it arifes from the fynchondrofis of the os pubis.

GRACULUS, the JACKDAW, in ornithology, a fpecies of corvus. See the articles CORVUS and JACKDAW.

GRACULUS PALMIPES, a fpecies of pelican, called in englifh the fhag. See SHAG.

GRADATION, in general, the afcending ftep by ftep, or in a regular and uniform manner.

GRADATION, in architecture, a flight of fteps, particularly in afcending from the cloifter to the choir in churches.

It alfo denotes an artful difpofition of feveral parts, as it were by fteps and degrees, after the manner of an amphitheatre; fo that thofe placed before, are rather ferviceable than the contrary, to thofe behind.

GRADATION, in logic, is an argumentation, confifting of four or more propofitions, fo difpofed, as that the attribute of the firft is the fubject of the fecond; and the attribute of the fecond, the fubject of the third; and fo on, till the laft attribute come to be predicated of the fubject of the firft propofition; as in Porphery's tree; 'man is an animal; an 'animal is a living thing; a living 'thing is a body; a body is a fub'ftance; therefore man is a fubftance.' An argument of this kind is liable to a world of fallacies, both from the ambiguity of words and things. *e. gr.* 'Pe'ter is a man; man is an animal; ani'mal is a genus; genus is an univerfal; 'therefore, Peter is an univerfal.'

GRADATION, in painting, a gradual and infenfible change of colour, by the diminution of the teints and fhades.

GRADATION, in rhetoric, the fame with climax. See the article CLIMAX.

GRADISKA, a city of Sclavonia, fituated on the river Save, twenty-five miles, weft of Pofega: eaft long. 18°, north lat. 45° 33′.

GRADO, in the italian mufic, the fame with degree. See the articles DEGREE and CONJOINT.

GRADO, in geography, an ifland of the Adriatic fea, thirty-five miles north-eaft of Venice.

GRADUAL, *graduale*, in ecclefiaftical writers, a book containing prayers to be ufed after the epiftle.

The romanifts ftill give the name gradual to a verfe fung after the epiftle.

GRADUATE, a perfon who has taken a degree in the univerfity. See the article DEGREE.

GRADUATION, in mathematics, the act of graduating or dividing any thing into degrees, or equal parts.

GRADUS, a degree. See DEGREE.

GRAFFER, a term met with in law books, fignifying a notary or fcrivener.

GRAFFIUM, a term alfo found in lawbooks, for a regifter or chartulary of deeds and other evidences.

GRAFT, or GRAFF, in gardening, a cion or fhoot of a tree inferted into another, fo as to make it yield fruit of the fame nature with that of the tree from whence the graft was taken.

In the choice of grafts, the following directions fhould be carefully obferved: 1ft. That they are fhoots of the former year. 2dly. That they are taken from healthy fruitful trees. And, 3dly. That you prefer thofe grafts which are taken from the lateral or horizontal branches, to thofe taken from the perpendicular fhoots. Thefe grafts fhould be cut off from the trees before the buds begin to fwell, which is generally three weeks or a month before the feafon for grafting; there-

therefore when they are cut off, they ſhould be laid in the ground with the cut downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying: if a ſmall joint of the former year's wood be cut off with the cion, it will preſerve it the better; and when it is grafted, this may be cut off; for the grafts muſt be cut to a proper length before they are inſerted into the ſtocks; but till then, the ſhoots ſhould remain their full length, as they were taken from the tree, which will preſerve them better from ſtriking. If theſe grafts are to be carried to a conſiderable diſtance, it will be proper to put their cut ends into a lump of clay, and to wrap them up in moſs, which will preſerve them freſh for a month or longer: but theſe ſhould be cut off earlier from the trees, than thoſe which are to be grafted near the place where the trees are growing. For the choice of ſtocks for grafting, ſee the article STOCK.

GRAFTING, or ENGRAFTING, is the taking a ſhoot from one tree, and inſerting it into another; in ſuch a manner, as that both may unite and become one tree. See the article GRAFT, *ſupra.*

The uſe of grafting is to propagate any curious ſorts of fruit, ſo as to be certain of the kinds; which cannot be done by any other method: for as all the good fruit have been actually obtained from ſeeds; the ſeeds of theſe, when ſown, will, many of them, degenerate, and produce ſuch fruit as are not worth cultivating: but when ſhoots are taken from ſuch trees as produce good fruit, theſe will never alter from their kind, whatever be the ſtock or tree on which they are grafted; for though the graft receive their nouriſhment from the ſtocks, yet they are never altered by them, but continue to produce the ſame kind of fruit as the tree from which they were taken.

General directions for GRAFTING. All ſuch trees as are of the ſame genus, *i. e.* which agree in their flower and fruit, will take upon each other; for inſtance, all nut-bearing trees may be ſafely grafted on each other; as may alſo the plum-bearing trees, under which head I reckon not only the ſeveral ſorts of plums, but alſo the almond, peach, nectarine, apricot, *&c.* which agree exactly in their general characters by which they are diſtinguiſhed from all other trees: but many of theſe are very ſubject to emit large quantities of gum from ſuch parts of the trees as are deeply cut and wounded, which, in the tender trees of this kind, *viz.* peaches and nectarines, being more common and hurtful, it is found to be the ſureſt method to bud or inoculate them. See INOCULATION.

All ſuch trees as bear cones will do well upon each other, though they may differ in one being ever-green, and the other ſhedding its leaves in winter; as is obſervable in the cedar of Libanus, and the larch-tree, which are found to ſucceed upon each other very well: but theſe muſt be grafted by approach; for they abound with a great quantity of reſin, which is apt to evaporate from the graft, if ſeparated from the tree before it be joined with the ſtock, whereby they are often deſtroyed; as alſo the laurel on the cherry, or the cherry on the laurel. All the maſt-bearing trees will alſo take upon each other, and thoſe which have a tender ſoft wood, will do well if grafted in the common way; but thoſe of a more firm contexture, and that are ſlow growers, ſhould be grafted by approach.

By ſtrictly obſerving this rule we ſhall ſeldom miſcarry, provided the operation be rightly performed and at a proper ſeaſon, unleſs the weather ſhould prove very bad. It is by this method that many kinds of exotic trees are not only propagated, but alſo rendered hardy enough to endure the cold of our climate in the open air; for being grafted upon ſtocks of the ſame ſort that are hardy, the grafts are rendered more capable of enduring the cold; as has been experienced in moſt of our valuable fruits now in England, which were formerly tranſplanted hither from more ſoutherly climates.

Methods of GRAFTING. We ſhall now give the methods of grafting, only firſt obſerving, that before the operation is begun, the following tools and materials ought to be provided, *viz.* a ſmall hand-ſaw, to cut off the heads of large ſtocks; a good ſtrong knife with a thick back, to make clefts in the ſtocks; a ſharp pen-knife to cut the grafts; a grafting chiſſel, and a ſmall mallet; baſs ſtrings or woollen yarn; and a quantity of clay, which ſhould be prepared a month before it is uſed, in the following manner: get ſome ſtrong, fat loam;

loam; then take some new stone-horse dung, and break it in amongst the loam; if you cut a little straw or hay very small, and mix amongst it, the loam will hold together the better; and if there be a quantity of salt added, it will prevent the clay from dividing in dry weather; this compound should be well stirred together, and water put to it in the manner of making mortar; after which it should be moistened afresh, and stirred every other day; but it ought to be remembered, that it should not be exposed to the frosts, or to drying winds. Of late years, some have made use of another composition for grafting, which they have found to answer the intention of keeping out the air, better than the clay just prescribed. This is composed of turpentine, bees-wax, and rosin, melted together, which when of a proper consistence, may be put on the stock round the graft, in the same manner as the clay is usually applied; and though it be not above a quarter of an inch thick, yet it will keep out the air more effectually than the clay; and as cold will harden it, there is no danger of its being hurt by frost, which is very apt to cause the clay to cleave and sometimes fall off; and when the heat of summer comes on, this mixture will melt and fall off without any trouble; but you must be careful not to apply it too hot, lest you injure the graft.

There are several ways of grafting, the principal of which are the following.

GRAFTING *in the rind*, also called crown-grafting, and shoulder-grafting, is only proper for large trees, where either the head of the large branches are cut off horizontally, and two or four cions put in, according to the size of the branch or stem: in doing of this the cions are cut flat on one side, with a shoulder to rest upon the crown of the stock; then the rind of the stock must be raised up, to admit the cion to enter about two inches between the wood and the bark of the stock, so as the shoulder of the cion may meet, and closely join the crown of the stock; and after the number of cions are inserted, the whole crown of the stock should be well clayed over, leaving two eyes of the cions uncovered. This method of grafting was formerly much more in practice than it is at present: its discontinuance was occasioned by the ill success with which it has been attended, from the cions being frequently blown out by strong winds, after they had made large shoots; which has sometimes happened after they have had five or six years growth; so that whenever this method is practised, there should be stakes fastened to support the cions, till they have almost covered the stock. This method of grafting is generally performed about the latter end of March, or the beginning of April.

Cleft-GRAFTING, also termed stock or slit-grafting, is practised upon stocks or trees of a smaller size, from an inch to two inches or more in diameter, and may be used with success where the rind of the stock is not too thick. This method of grafting is to be performed in the months of February and March; and in doing it, the head of the stock or branch must be cut off with a slope, and a slit made the contrary way in the top of the slope, deep enough to receive the cion, which should be cut sloping like a wedge, so as to fit the slit made in the stock, being careful to leave that side of the wedge which is to be placed outward, much thicker than the other; and in putting the cion into the slit of the stock, great care must be taken to join the rind of the cion to that of the stock; for if these do not unite, the grafts will not succeed: when this method of grafting is used to stocks which are not strong, it will be proper to make a ligature of bass to prevent the slit of the stock from opening; then the whole should be clayed over, to prevent the air from penetrating the slit, so as to destroy the grafts; only leaving two eyes of the cions above the clay for shooting.

Whip GRAFTING, also called tongue-grafting, is most commonly practised of any by the nurserymen near London, especially for small stocks, because the cions much sooner cover the stocks in this method than in any other. This is performed by cutting off the heads of the stocks sloping; there must then be a notch made in the slope toward the upper part downwards, a little more than half an inch deep, to receive the cion, which must be cut with a slope upward, and a part left in this slope like a tongue; which tongue must be inserted into the slit made in the slope of the stock, so as that the two rinds of both cion and stock may be equal and join together exactly;

then there should be a ligature of bass to fasten the cion, so as that it may not be easily displaced; and afterwards clay it over, as in the former methods.

Root-GRAFTING, consists in grafting a fine fruitful branch upon a root. The manner of performing it, is to take a graft of the tree you design to propagate, and a small piece of the root of another tree of the same kind, or very near it, or pieces of roots cut from such tree as you transplant, and whip-graft them, binding them well together. This tree may be planted where you would have it stand, for the piece of root will draw sap and feed the graft, as the stock does in the other methods.

GRAFTING *by approach*. See INARCHING.

Escutcheon GRAFTING. See the article INOCULATION.

GRAIES, a market-town of Essex, situated on the river Thames, seventeen miles east of London.

GRAIN, all sorts of corn, as wheat, barley, oats, rye, *&c.* See the articles CORN, WHEAT, *&c.*

GRAIN is also the name of a small weight, the twentieth part of a scruple in apothecaries weight, and the twenty-fourth of a penny-weight troy. See the article WEIGHT.

A grain-weight of gold-bullion is worth two-pence, and that of silver but half a farthing.

GRAIN also denotes the component particles of stones and metals, the veins of wood, *&c.* Hence cross-grained, or against the grain, is contrary to the fibres of wood, *&c.*

GRAINING-BOARD, among curriers, an instrument called also a pummel, used to give a grain to their leather. See the article CURRYING.

GRAMEN, GRASS, in botany. See the article GRASS.

GRAMINEOUS HERBS, those with narrow oblong leaves, without any pedicle.

GRAMMAR, γραμματικη, the art of speaking and writing any language with propriety.

Grammar is usually divided into four parts, orthography, etymology, syntax, and prosody. See ORTHOGRAPHY, *&c.*

Many are of opinion, that grammar is an art or science antecedent to languages; which, according to them, ought to be accommodated to these original principles. But just the reverse of this is true. Languages were by no means made for grammar, but that for them. It serves to teach languages to those who are ignorant of them; and, therefore, should be accommodated to the genius of each language in particular. In a philosophical view, indeed, there are some circumstances indifferently essential to them all; but this natural agreement is so much altered by the different customs of various languages, as to be for the most part utterly unknown. A just and exact method of grammar, therefore, can be only that, which, supposing a language introduced by custom, without attempting any alteration in it, furnishes certain observations called rules, to which the methods of speaking used in this language, may be reduced; and this collection of rules is what is called grammar.

Grammar, says lord Bacon, is of two kinds; the one having relation to speaking, the other to writing: for, as Aristotle well observed, words are the signs or marks of thoughts, and letters of words. See the articles LANGUAGE, LETTER, WORD, *&c.*

According to the same noble author, grammar holds the place of a conductor, in respect of the other sciences; and tho' the office be not noble, it is extremely necessary; especially as the sciences, in our times, are chiefly derived from the learned languages. It is of less use in maternal languages, than in learning the foreign ones; but is most of all serviceable in the dead ones, or such as are only preserved in books.

Philosophical GRAMMAR, one proposed by lord Bacon, not upon any analogy which words bear to each other, but such as should diligently examine the analogy or relation betwixt words and things. He disapproves of too curious an enquiry about the imposition and original etymology of names. This he thinks an elegant, and as it were a waxen subject, that may be handsomely wrought and twisted, but is attended with little truth and advantage. But, says he, it would be a noble kind of grammar, if any one, well versed in languages, both the learned and vulgar, should treat of their various properties; shewing wherein each of them excelled, and fell short: for thus languages might be enriched by mutual commerce; and one beautiful image of speech, or one grand model of language, for justly expressing the sense of mankind, formed, like the Venus of Apelles, from the excellencies of several,

And thus, at the same time, we should have some considerable marks of the genius and manners of people and nations, from their respective languages. See farther remarks on this subject in Bacon's Doctrine of Delivery, Sect. 7.

GRAMMAR is also used for a book containing the rules of this art, methodically digested; of which there are multitudes indeed, but few good ones.

GRAMMAR is likewise used in a synonymous sense with elements, as a geographical grammar, &c.

GRAMMARIAN, one that is skilled in, or teaches grammar.

Antiently the name grammarian was a title of honour, literature, and erudition; being given to persons accounted learned in any art or faculty whatever. But it is otherwise now, being frequently used as a term of reproach, to signify a dry plodding person, employed about words and phrases, but inattentive to the true beauties of expression and delicacy of sentiment. The antient grammarians, called also philologers, must not be confounded with the grammatists, whose sole business was to teach children the first elements of language. Varro, Cicero, Messala, and even Julius Cæsar, thought it no dishonour to be ranked among grammarians, who had many privileges granted to them by the roman emperors.

GRAMMATICAL, in general, something belonging to grammar. See the article GRAMMAR.

GRAMMONT, a town of the austrian Netherlands, in the province of Flanders, situated on the river Dender: east long. 3° 50′, and north lat. 50° 55′.

GRAMPOUND, a borough-town of Cornwall, thirty-eight miles south-west of Launceston: west long. 5° 25′, and north lat. 50° 20′.

It sends two members to parliament.

GRAMPUS, in ichthyology, the english name of a fish of the dolphin-kind, with the snout turning upwards, and broad serrated teeth. See DELPHINUS.

GRAN, a city of lower Hungary, situated on the Danube: east long. 18° 40′, north lat. 48°.

GRANA REGIA and TIGLIA, in the materia medica, names by which the purging grains or seeds of ricinus are called. They are violent and dangerous purgatives, prescribed in the Indies in rheumatisms and dropsies; but whilst safer and equally efficacious medicines may be had there is no necessity to have recourse to these.

GRANADA, a province of Spain, bounded by Andalusia on the north, by Mursia and the Mediterranean on the east, by the same sea on the south, and by Andalusia on the west.

GRANADA, the capital city of the province of Granada, in Spain, situated two hundred miles south of Madrid: west long. 3° 40′, and north lat. 37° 15′.

GRANADA, a province of terra firma, in south America, bounded on the north by the provinces of Carthagena and St. Martha, on the east by Venezuela, by Popoyan on the south, and by Darien on the west.

GRANADA, a city of Mexico, in north America, situated on the side of the lake Nicaragua: west long. 89°, and north lat. 11° 8′.

GRANADA is also the most southerly of the Caribbee-islands, situated one hundred and fifty miles south-west of Barbadoes: west long. 61° 30′, and north lat. 12° 15′.

GRANADIER, a soldier armed with a sword, a firelock, a bayonet, and a pouch full of hand-granadoes. They wear high caps, are generally the tallest and briskest fellows, and are always the first upon all attacks.

Every battalion of foot has generally a company of grenadiers belonging to it, or else four or five grenadiers belong to each company of the battalion; which, on occasion, are drawn out, and form a company of themselves. These always take the right of the battalion.

Horse-GRENADIERS, called by the French *grenadiers volans*, or flying-grenadiers, are such as are mounted on horseback, and fight on foot: their exercise is the same with the other grenadiers.

GRANADILLOS, some of the Caribbee-islands, situated between the island of St. Vincent and Granada; but so inconsiderable that no nation has thought them worth possessing.

GRANADO, a hollow ball or shell, of iron or other metal, about two inches and a half in diameter; which being filled with fine powder, is set on fire by means of a small fusee fastened to the touch-hole, made of the same composition as that of a bomb: as soon as the fire enters the shell, it bursts into many pieces, much to the damage of all that stand near. See the article BOMB.

Thuanus observes, that the first time granadoes

nadoes were uſed, was at the ſiege of Wachtendonck, a town near Gueldres: and that the inventor was an inhabitant of Venlo, who, in making an experiment thereof, occaſioned two thirds of that city to be burnt, the fire being kindled by the fall of a granado.

GRANARY, a building to lay or ſtore corn in, eſpecially that deſigned to be kept a conſiderable time.

Sir Henry Wotton adviſes to make it look towards the north, as much as may be, becauſe that quarter is the cooleſt and moſt temperate. Mr. Worlidge obſerves that the beſt granaries are built of brick, with quarters of timber wrought in the inſide, to which the boards may be nailed, with which the inſide of the granary muſt be lined ſo cloſe to the bricks, that there may not be any room left for vermine to ſhelter themſelves. There may be many ſtories one above another, which ſhould be near the one to the other; becauſe the ſhallower the corn lies, it is the better, and more eaſily turned.

Some have two granaries, one above the other, and fill the upper with wheat, or other corn; the upper one having a ſmall hole in the floor, by which the corn falls down into the lower one, like the ſand in an hour-glaſs; which, when it is all come down into the lower granary, is carried up again into the upper one; and by this means, is kept continually in motion, which is a good preſervative for the corn. A large granary, full of ſquare wooden pipes, may likewiſe ſerve to keep corn from heating.

In Kent, when corn is firſt brought into granaries, they lay it about half a foot thick, turn it twice a week, and once in that time ſcreen it, for the firſt two months; after which they lay it a foot thick for two months more, turning it once or twice a week, and ſcreening it proportionably according as the weather is moiſt or dry. After five or ſix months more, they lay it two feet thick, and turn it once a fortnight, ſcreening it once a month, as occaſion requires. After a year, they lay it two feet and a half, or three feet thick, and turn it once in three weeks or a month, ſcreening it proportionably. When it has lain two years or more, they turn it once in two months, and ſcreen it once a quarter. And in this manner they proceed, turning and ſcreening it at greater or ſmaller intervals, according as they find it in brightneſs, hardneſs, and drineſs; for the oftener the grain is turned, the better it proves. For this purpoſe, an empty ſpace, about a yard wide, is left on all ſides of the room, and another at ſix feet diſtance through the whole area, into which empty ſpaces they turn the corn, as often as neceſſary. See the article CORN.

Before the corn is brought into granaries it ought to be well cleaned from impurities, and thoroughly dried; for it is obſervable, that ſuch corn ſucceeds beſt.

In many parts of Africa, they preſerve corn in deep pits, made in dry ſandy ground, or even the ſolid rock: on the floor of theſe they lay a bed of ſtraw, then a ſtratum of corn; after that another bed of ſtraw, and then another of corn; and in this manner they proceed till the whole is filled up, taking care to place a layer of ſtraw between the corn and the ſides of the pit.

GRANATE, or GARNET, *granatus*, in natural hiſtory. See GARNET.

GRAND, a term borrowed from the french, of the ſame import with *great*.

GRAND ASSISE, in law, a writ to determine the right of property in a real action.

GRAND CAPE, or CAPE MAGNUM. See CAPE.

GRAND DAYS, are thoſe days in the ſeveral terms, which are ſolemnly kept in the inns of court and chancery, *viz.* candlemas-day, aſcenſion-day, St. John the Baptiſt, and All-ſaints-day.

GRAND DISTRESS, a writ that lies in two caſes, either when a tenant or defendant is attached, and does not appear: or where he has appeared, if he afterwards makes default, in which caſe this proceſs lies inſtead of a petit cape; and thereby all the goods and chattels of the defendant may be diſtrained within the county. See the article DISTRESS.

GRAND JURY, is the jury who find bills of indictment before juſtices of peace and gaol-delivery, or of oyer and terminer, &c. againſt any offenders that may be tried for the fact.

GRANDE, a branch of the river Niger, in Africa, which diſcharges itſelf into the Atlantic ocean, in 15° weſt long. and 11° north lat.

GRANDE, is alſo a river of Braſil, in the province of Del Rey, in ſouth America, which diſcharges itſelf into the Atlantic ocean, in 51° weſt long. and 32° ſouth lat.

GRANDEE, a deſignation given to a nobleman of Spain or Portugal.

The grandees are ſuffered to be covered before the king, who treats them like

 princes,

princes, ftiling them Illuftrious, in his letters; and in fpeaking to them, or of them, they are ftyled Eminences.

GRANDENTZ, or GRAUDENTZ, a city of Poland, forty-two miles fouth of Dantzick: eaft longit. 19°, and north lat. 53° 30′.

GRANDPRE, a town of Champaign, in France, thirty miles eaft of Rheims: eaft long. 4° 56′, and north lat. 49° 18′.

GRANGE, a houfe or farm, not only furnifhed with neceffary places for all manner of hufbandry, as ftables for horfes, ftalls for cattle, *&c.* but where there are granaries and barns for corn, hay-lofts, *&c.* And by the grant of a grange, fuch places will pafs, without being particularly mentioned.

GRANICUS, a little river near the Hellefpont, in the leffer Afia, where Alexander fought the firft battle with the forces of Darius.

GRANIFEROUS PODS, among herbalifts, thofe that bear fmall feeds like grain.

GRANITE, *granita*, in natural hiftory, a diftinct genus of ftones, compofed of feparate and very large concretions rudely compacted together, of great hardnefs, giving fire with fteel, not fermenting with acids, and flowly and imperfectly calcinable in a great fire.

Of this genus there are three fpecies: 1. The hard white granite, with black fpots, commonly called moor ftone: this is a very valuable kind, confifting of a beautiful congeries of very varioufly conftructed and differently coloured particles, not diffufed among, or running into one another but each pure and diftinct, though firmly adhering to whichever of the others it comes in contact with, and forming a very firm mafs: it is much ufed in London for the fteps of public buildings, and on other occafions where great ftrength and hardnefs are required. 2. The hard red granite, variegated with black and white, and common in Egypt and Arabia. 3. The pale whitifh granite, variegated with black and yellow. This is fometimes found in ftrata, but more frequently in loofe nodules, and is ufed for paving the ftreets.

GRANIVOROUS, an appellation given to animals which feed on corn or feeds. Thefe are principally of the bird-kind.

GRANT, in law, a conveyance in writing of fuch things as cannot pafs or be conveyed by word only; fuch are rents, reverfions, fervices, advowfons in grofs, tithes, *&c.* The perfon making fuch a conveyance is called the grantor, and he to whom the grant is made, the grantee.

A grant has ufually the words *give and grant, &c.* which in a deed of what lies in grant, will amount either to a gift, grant, feoffment, or releafe, *&c.* and accordingly may be pleaded: though to every good grant it is requifite that there be a grantor, or perfon able to give; a grantee, capable of the thing granted; fomething granted, as grantable; that it be done in the manner the law requires; and that there be an agreement to, and an acceptance of the grant by him to whom made, *&c.*

When perfons *non fanæ memoriæ* make grants, they may be good as to themfelves, though voidable by their heirs, *&c.* and notwithftanding infants and feme coverts are prohibited by law to be grantors, yet they may be grantees: however, an infant, when at his full age, may difagree to his grant, and the hufband to that made to his wife. All grants are expounded according to the fubftance of the deed in a reafonable fenfe, and agreeable to the intent of the parties. In cafe a perfon grants a rent-charge out of land, and he has then nothing in the fame, admitting he afterwards purchafes the land, neverthelefs the grant is void. And the law does not allow of grants of titles only, or imperfect intereft, or of things that are merely future. Likewife grants may be void on account of uncertainty, impoffibility, being againft the law, *&c.*

GRANT *of the king* is good for himfelf and his fucceffors, though they are not named therein: but the king may not grant away an eftate-tail in the crown.

A grant tending to a monopoly cannot be made by the king, to the detriment of the intereft and liberty of the fubject; neither can the king make a grant non obftante any ftatute, made or to be made; for if he does, any fubfequent ftatute prohibiting what is granted will be a revocation of the grant: yet there may be a non obftante to a former grant made by the king, where he has been deceived in fuch grant, as where it contains more than what was intended to be granted, or there is any deceit in the confideration, *&c.* by which the firft grant becomes void.

GRANTHAM, a borough-town of Lincolnfhire, twenty-two miles fouth of Lincoln.

It fends two members to parliament.

GRANVILLE, a port-town of Normandy,

dy, from whence the noble family of Carteret take the title of earl.

GRANULATED, ſomething that has undergone granulation. See the next article.

GRANULATION, according to Cramer, is the reducing metals to ſmall particles, in order to promote their fuſion and mixture with other bodies.

This is more coarſely done in the wet way, by means of running them into water through a new broom, or rolling them about in a hollow cylinder contrived on purpoſe: but the nicer and finer is the dry method, by means of a wooden box chalked within. Lead is very nicely granulated this way, and is to be done in the following manner.

Put a quantity of lead into an iron-ladle, and melt it ſlowly over a gentle fire; ſo ſoon as it is perfectly liquid, pour it into a round wooden box, with a wooden cover nicely fitted to it; and let both that and the cavity of the box be well rubbed over with chalk: ſhut the box immediately when the melted lead is in, and ſhake it violently, ſo that the metal within may be agitated forcibly againſt all parts of the box. Continue this agitation till the metal is cold, and on opening the box, you may find the greateſt part of it finely granulated, or comminuted into very ſmall porous grains. Let the chalk that adheres to theſe grains be rubbed off, and then ſift them, to make them of an equal ſize.

Lead, tin, and braſs are the moſt proper metals for this proceſs, ſince theſe, when ready to melt, are always extremely brittle, ſomewhat like wetted ſand. This ſort of granulation, therefore, cannot be obtained from ſuch metals as are the more tenacious the nearer they come to fuſion, as gold, ſilver, *&c.* for which reaſon theſe can only be granulated the other and coarſer way, by means of water.

GRANULOSE ROOTS, thoſe compoſed of ſmall knobs, like grains of corn.

GRAPE, the fruit of the vine, *vitis.* See the article VINE.

Thoſe kind of grapes which are thin-ſkinned, grow ſooner ripe than others, and will thrive in a temperate climate, where the others will not. If it happen that grapes are ſtruck with hail at the time that they are large and near ripening, they never become ripe at all, but harden, and ſo remain. See WINE.

The beſt ſort of grapes are the white and ſweet grapes with a tender ſkin, and without ſtones. It is ſaid, that this fruit, when ripe, is of an hot and moiſt nature, very fattening, refreſhing an inflamed liver, provoking urine, and good for the ſtomach; yet being windy, they diſturb the entrails, ſo that they are beſt eaten before meals, or elſe with pomegranates, and other ſharp fruit: but if for a few days they are hung up, they will loſe their windineſs and become better. See the article RAISINS.

The juice of the agreſtæ, or unripe wild grapes, is the omphacinum of the antients, as their oleum omphacinum was the expreſſed oil from the unripe olives. They uſed to expoſe the grapes to the ſun for ſome days, and then preſs out their juice into large vats: and in the time of Dioſcorides, they uſed to let it ſtand open in them, expoſed to the ſun, till moſt of the humidity was exhaled, and the remainder inſpiſſated into a rob, a form much uſed among the antients. This is reckoned a cooler, but has no place in our preſent pharmacy.

GRAPHOMETER, a mathematical inſtrument, otherwiſe called a ſemi-circle, the uſe of which is to obſerve any angle, whoſe vertex is at the center of the inſtrument in any plane (though it is moſt commonly horizontal, or nearly ſo) and to find how many degrees it contains.

The graphometer is a graduated ſemicircle A B C, made of wood, braſs, or the like, and ſo fixed on a fulcrum G H, by means of a braſs-ball and ſocket, that it eaſily turns about, and retains any ſituation. It has two ſights fixed on its diameter A C, and at the center there is commonly a magnetical needle and compaſs in a box. There is likewiſe a moveable ruler, or index E D, with two ſights P, P; which turns round the center, and retains any ſituation given it. See plate CXVIII. fig. 2. n° 1. and 2.

To meaſure by this inſtrument any angle A C B (*ibid.* n° 3.) in any plane, and comprehended between the right lines A C and B C, drawn from two points A and B, to the place of ſtation C. Let the graphometer be placed at C, ſupported by its fulcrum; and let the immoveable ſights on the diameter of the inſtrument D E, be directed towards the point A; and likewiſe while the inſtrument remains immoveable, let the ſights of the ruler F G, which is moveable about the center C, be directed to the point B. Now it is evident, that the moveable ruler cuts off an arch D H, which is the meaſure of the angle A C B, ſought.

ſought. Moreover, by the ſame method, the inclination of D E, or of F G, may be obſerved with the meridian line, which is pointed out by the magnetic needle incloſed in the box, and moveable about the center of the inſtrument.

GRAPTOLITHUS, in natural hiſtory, a name given by Linnæus to a kind of ſtone, reſembling a geographical map, found in Scandinavia.

GRAPNELS, a ſort of anchors with four flooks, ſerving for boats to ride by.

There is alſo a kind called fire and chain-grapnels, made with four barbed claws inſtead of flooks, and uſed to catch hold of the enemies rigging, or any other part, in order for boarding them. See plate CXXI. fig. 1.

GRASS, *gramen*, in botany, *&c.* a name given to ſeveral diſtinct plants, as the agroſtis or couch-graſs, the briza or quacking-graſs, *&c.* Under the term graſs are alſo comprehended all manner of herbaceous plants ſerving for the food of cattle, as clover, rye-graſs, *&c.*

The beſt ſeaſon for ſowing graſs-ſeed is the latter end of Auguſt and the beginning of September, that the graſs may be well rooted before the froſt ſets in, which is apt to turn the plants out of the ground when not well rooted. This ſeed ſhould be ſown in moiſt weather, or when there is a proſpect of ſhowers; but where this cannot be performed in autumn, the ſeeds may be ſown in the ſpring, about the latter end of March, if the ſeaſon proves favourable.

Some people mix clover and rye-graſs ſeeds together, allowing ten pounds of clover and one buſhel of rye-graſs to an acre; but this is only to be done where the land is deſigned to remain but three or four years in paſture, becauſe neither of theſe kinds are of long duration; ſo that where the land is deſigned to be laid down for many years, it will be proper to ſow with the graſs-ſeeds ſome white trefoil, or dutch clover, which is an abiding plant, and ſpreads cloſe to the ſurface of the ground, ſending forth roots at every joint, and makes the cloſeſt ſward of any, and is the ſweeteſt food for cattle: ſix or eight pounds of this ſeed ſhould always be ſown upon each acre.

The land on which graſs-ſeed is intended to be ſown, ſhould be well plowed, and cleared from the roots of noxious weeds, ſuch as couch-graſs, fern, ruſhes, heath, gorſe, broom, reſt harrow, *&c.* which if left in the ground, will ſoon get the better of the graſs, and over-run the land. Therefore, where any of theſe weeds abound, it will be a good method to plow up the ſurface in April, and let it lie ſome time to dry; then lay it in ſmall heaps, and burn it: the aſhes ſo produced will be a good manure for it. But where couch-graſs, fern, or reſt-harrow grow thick, and their roots run far under ground, the land ſhould be plowed two or three times pretty deep in dry weather, and the roots carefully harrowed off after each plowing, which is the moſt certain method of deſtroying them.

Before the ſeed is ſown, the ſurface of the ground ſhould be made level and fine, otherwiſe the ſeed will be buried unequally. The quantity of graſs-ſeed for an acre of land is uſually three buſhels, if the ſeed be clean; otherwiſe a much greater quantity muſt be allowed: when the ſeed is ſown it muſt be gently harrowed in, and the ground rolled with a wooden roller, which will make the ſurface even, and prevent the ſeeds being blown in patches. If, when the graſs comes up, there ſhould be any bare ſpots where the ſeed has not grown, they may be ſown again, and the ground rolled, which will fix the ſeeds, and the firſt kindly ſhowers will bring up the graſs.

If any thiſtles, ragwort, or ſuch other troubleſome weeds in the following ſpring come up among the graſs, they ſhould be carefully cut up with a ſpaddle before they grow too large; and this ſhould be repeated two or three times in the ſummer, which will effectually deſtroy them.

As to graſs-plats and green walks, they are made, for the moſt part, not by ſowing graſs-ſeed, but by laying turfs: and indeed the turfs from a fine common or down, are much preferable to ſown graſs: but if walks or plats are to be made by ſowing, the beſt way is to procure the ſeed from thoſe paſtures where the graſs is naturally fine and clear, or elſe the trouble of keeping it from ſpiry or benty graſs will be very great, and it will ſcarce ever look handſome.

In order to ſow graſs-walks, the ground muſt be firſt dug; and when it has been firſt dreſſed and laid even, it muſt be very carefully raked over, and all the clods and ſtones taken off and then covered over an inch thick with good mould. This being done, the ſeed is to be ſown pretty thick, that it may come up cloſe and ſhort; it muſt then be raked over again, to cover the ſeed, that if the weather ſhould happen to be windy it may not

Fig: 1. The GREEN GOLD-FINCH.

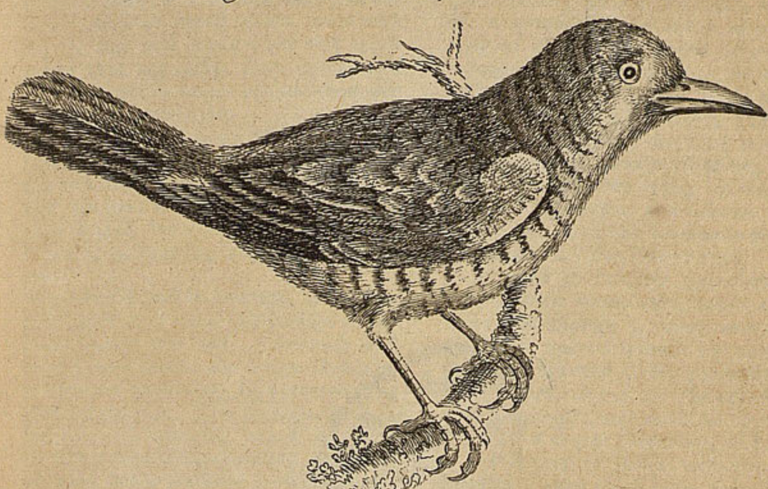


Fig: 2. The RED-HEADED GREEN-FINCH.



Fig: 3. GLYCYRRHIZA Liquorice.



T. Jefferys Sculp.


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not be blown away. It ought alſo to be obſerved, that where graſs is ſown in gardens, either for lawns or walks, there ſhould always be a good quantity of the white trefoil or dutch clover ſown with it; for this will make a fine turf much ſooner than any other ſown graſs, and will continue a better verdure than any other of the graſs-tribe.

In order to keep graſs plats or walks handſome, and in good order, you may ſow in autumn freſh ſeed over any places that are not well filled, or where the graſs is dead: but nothing improves graſs ſo much, as mowing and conſtant rolling.

When turf is laid in gardens, it is a general practice to cover the ſurface of the ground under the turf, either with ſand or very poor earth: the deſign of this is, to keep the graſs fine, by preventing its growing too rank. This is proper enough for very rich ground, but it is not ſo for ſuch land as is but middling, or poor; for when this is practiſed in ſuch places, the graſs will ſoon wear out and decay in patches.

When turf is taken from a common or down, ſuch ought to be choſen as is free from weeds: and when it is deſigned to remain for years without renewing, a dreſſing ſhould be laid upon it every other year, either of very rotten dung, aſhes, or where it can be eaſily procured, very rotten tan; but theſe dreſſings ſhould be laid on early in the winter, that the rain may waſh them into the ground, otherwiſe they will occaſion the graſs to burn, when the warmth of the ſummer begins. Where graſs is ſo dreſſed, and kept well rolled and mowed, it may be kept very beautiful for many years; but where it is not dreſſed, or fed with ſheep, it will rarely continue handſome more than eight or ten years.

GRASSHOPPER, in zoology, a ſpecies of gryllus, frequent in paſtures. See the article GRYLLUS.

Theſe inſects ſometimes infeſt particular places in prodigious ſwarms, and eat up the whole fruits of the earth, like the devouring locuſts. See LOCUST.

GRATIAS A DIOS, a cape or promontory of the province of Honduras, in Mexico: weſt long. 84°, north latitude 14° 30′.

GRATINGS, in a ſhip, a kind of lettice-work formed of ledges and battins, the ſquare holes of which being three or four inches wide, are for the current footing of men over hatch-ways, to give air below, and vent for the ſmoke in an engagement.

GRATIOLA, HEDGE HYSSOP, in botany, a genus of the diandria monogynia claſs of plants, the flower of which is monopetalous and ringent; its tube is longer than the cup, and of an angular figure, and the limb is ſmall, and divided into four parts: the fruit is an oval pointed capſule, compoſed of two valves, and containing two cells; in which are included numerous ſmall ſeeds. Some erroneouſly confound it with the digitalis, or fox-glove. See DIGITALIS.

It is good in dropſies, jaundices, and other chronic complaints, taken in infuſion; and though a rough and violent medicine, operating both by vomit and ſtool, is reckoned a very powerful one.

GRATIOSA, one of the Azores-iſlands: weſt long. 29°, and north lat. 39°.

GRATZ, a city of Germany, and capital of the dutchy of Stiria, ſixty-five miles ſouth of Vienna: eaſt long. 15° 55′, and north lat. 47° 20′.

GRAVE, in muſic, is applied to a ſound, which is of a low or deep tune. See the article TUNE.

The thicker the cord or ſtring, the more grave is the note or tone; and the ſmaller, the more acute. The gravity of ſounds depends on the ſlowneſs of the vibratory motions of the chord; and their acuteneſs, on its quick vibrations.

Grave, in the italian muſic, denotes a very grave and ſlow motion, ſomewhat faſter than adagio, and ſlower than largo.

GRAVE ACCENT, in grammar, ſhews that the voice is to be lowered: its mark ſtands thus \`. See the article ACCENT.

GRAVE alſo denotes a tomb, or ſepulchre, wherein the dead are buried.

GRAVE, in geography, a ſtrong city of the Netherlands, in the province of dutch Brabant, eight miles ſouth of Nimeguen: eaſt longitude 5° 45′, and north latitude 51° 50′.

GRAVEDO, in medicine, a heavineſs and pain in the head, which always accompanies a catarrh. See CATARRH.

This word, ſtrictly ſpeaking, ſignifies a catarrhal affection, in which there is no actual excretion of a ſerous matter, but only a congeſtion of it, with ſtagnation. It is frequently underſtood in the ſame ſenſe with coryza. See CORYZA.

The ſigns of a gravedo are a dizzineſs and heavi-

heavineſs of the head, attended with tenſive and preſſing pains, which ſometimes becomes violently pungent and as it were burning, a remarkable turgeſcence of the veſſels, thirſt, and a dryneſs of the mouth, and unſound ſleep ; and finally the breaſt is drawn into conſent, and is afflicted with a tenſive and oppreſſive pain.

The gravedo is a ſpecies or rather ſymptom of the head-ach, and conſequently is removed by the ſame means uſed againſt it. See the article HEAD-ACH.

GRAVEL, in natural hiſtory and gardening, a congeries of pebbles, which, mixed with a ſtiff loam, makes laſting and elegant gravel-walks; an ornament peculiar to our gardens, and which gives them the advantage over thoſe of other nations.

There are many different opinions about the choice of gravel ; ſome are for having it as white as poſſible, and in order to make the walks more ſo, cauſe them to be rolled with ſtone-rollers, which are often hewn by the maſons ſo as to add a whiteneſs to the walks ; but this renders them troubleſome to the eyes by their reflecting too ſtrongly the rays of light; this therefore ſhould be avoided, and ſuch gravel as will lie ſmooth, and reflect the leaſt, ſhould be preferred. Again, ſome ſcreen the gravel too fine, but this is an error ; for if it be caſt into a round heap, and the great ſtones only are raked off, it will be the better. There are many kinds of gravel which do not bind, and by this means cauſe a continual trouble of rolling, to little or no purpoſe : as for ſuch, if the gravel be looſe or ſandy, you ſhould take one load of ſtrong loam and two of gravel, and ſo caſt them well together.

The month of March is the propereſt time for laying gravel ; for it is not prudent to do it ſooner, or to lay walks in any of the winter-months before that time. In making theſe walks, great regard muſt be had to the level of the ground, ſo as to lay the walks with eaſy deſcents toward the low parts of the ground, that the wet may be eaſily drained off: but when the ground is level, it will be proper to have ſink-ſtones laid by the ſides of the walk, and at convenient diſtances, to let off the wet ; and when the ground is naturally dry, the drains from the ſink-ſtones may be contrived ſo as to convey the water into ſeſſpools, from which the water will ſoak away in a ſhort time : but in wet lands there ſhould be under-ground drains, to convey the water off, either into ponds, ditches, or the neareſt place proper to receive it.

Some are apt to lay gravel-walks too round ; but this is an error, becauſe they are not ſo good to walk upon ; and beſides, it makes them look narrow ; one inch is enough in a crown of five feet ; and it will be ſufficient, if a walk be ten feet wide, that it lies two inches higher in the middle than it does on each ſide ; if fifteen feet, three inches ; if twenty feet, four inches; and ſo in proportion. For the depth of gravel-walks, ſix or eight inches may do well enough ; and a foot in thickneſs will be ſufficient for any ; but then there ſhould always be a depth of rubbiſh laid under the gravel, eſpecially if the ground be wet.

Some turn up gravel-walks into ridges in December, in order to kill the weeds; but this is very wrong, ſince it never anſwers the end, and therefore if conſtantly rolling them after rain and froſt will not effectually kill the weeds and moſs, you ſhould turn the walks in March, and lay them down at the ſame time.

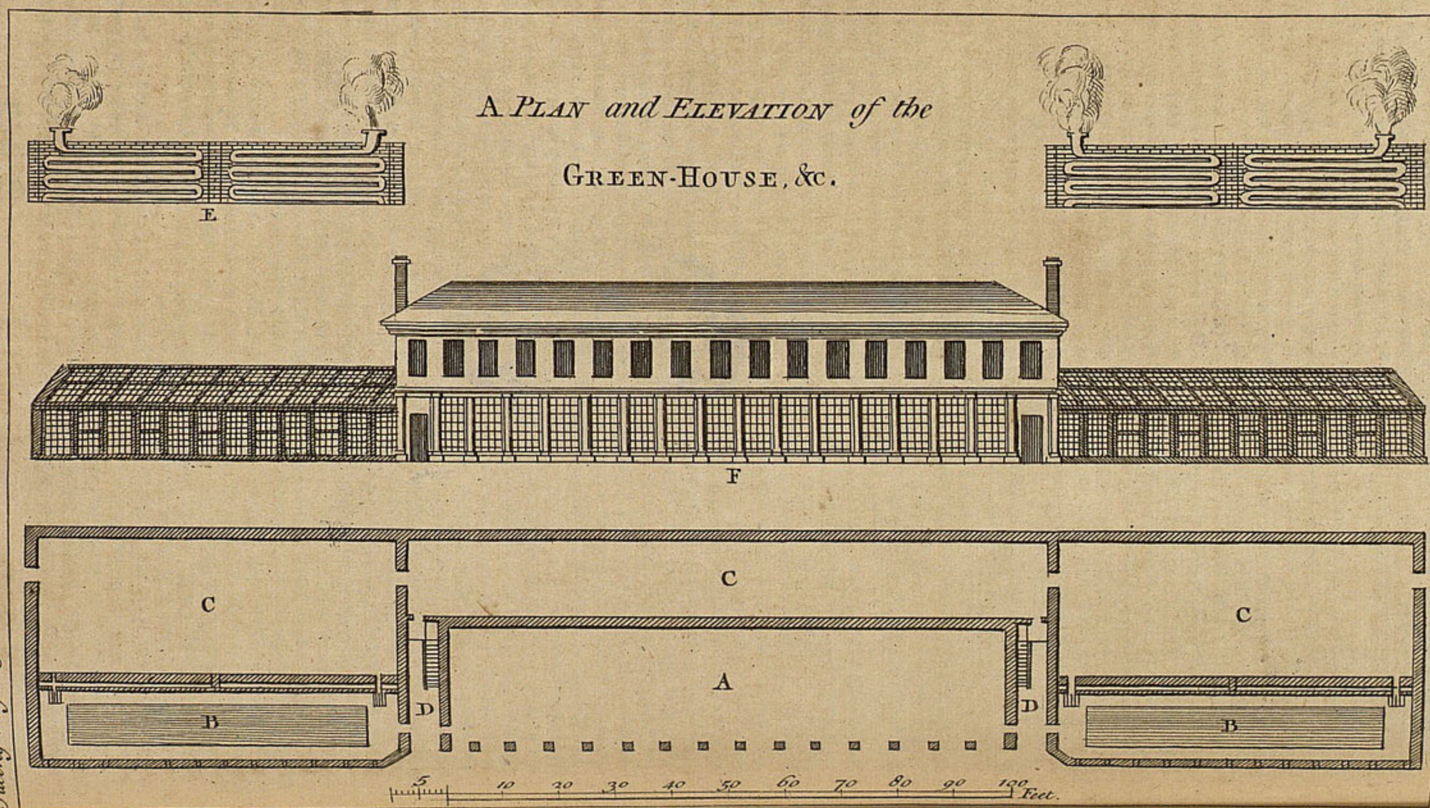
In order to deſtroy worms that ſpoil the beauty of gravel or graſs-walks, ſome recommend the watering them by water made very bitter by walnut-tree leaves being ſteeped in it : but if in the firſt laying of the walks there be a good bed of lime-rubbiſh laid in the bottom, it will be the moſt effectual method to keep out the worms, for they do not care to harbour near lime.

GRAVEL, in medicine, a terrible diſtemper ariſing from a gritty matter concreting into ſmall ſtones in the bladder. See the article STONE.

GRAVELIN, a port-town of the french Netherlands, twelves miles ſouth-weſt of Dunkirk.

GRAVELLING, a misfortune that happens to a horſe by travelling, occaſioned by gravel-ſtones getting between the hoof and the ſhoe, which ſettling at the quick, there feſter and fret. It is cured by taking off the ſhoe, picking out all the gravel, and afterwards waſhing and cleanſing the part affected ; which done, ſheep's tallow and bay-ſalt melted together, are to be poured hot upon it, and the ſhoe ſet on again ; and at two or three dreſſings it will be healed.

GRAVELLY LAND, or ſoil, that abounding with gravel and ſand, which eaſily admits of heat and moiſture ; and the more ſtony they are, the more barren they prove.



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The beſt produce of theſe lands in corn, is rye, white-oats, brank-turneps, &c. The natural produce in weeds, is quick-graſs, ſorrel, broom, furze, brakes, heath, &c. The beſt manure is marl, or any ſort of clay that will diſſolve with the froſt, cow-dung, chalk, mud, and half-rotten ſtraw from dunghills.

GRAVENEC, a town of Swabia, in Germany, thirty miles weſt of Ulm.

GRAVER, in the art of engraving, a tool by which all the lines, ſcratches, and ſhades are cut in copper, &c.

Gravers are of three ſorts, round-pointed, ſquare-pointed, and lozenge. The round are the beſt for ſcratching withal; the ſquare-pointed are for cutting the largeſt ſtrokes; and the lozenge-pointed ones for the moſt fine and delicate ſtrokes: but a graver of a middle form, between the ſquare and lozenge-pointed, will make the ſtrokes or hatches appear with more life and vigour.

The manner of making the gravers is as follows: provide ſome croſs-bow ſteel, and procure it to be beaten out into ſmall rods, and ſoftened, and then, with a good file, ſhape them as you pleaſe. This being done, heat them red-hot, and then immediately dip them in ſoap, which will render them very hard. In doing this obſerve, that if you turn your hand never ſo little awry in dipping them into the ſoap, the graver will be crooked. If the graver prove too hard, lay the end of it upon red-hot charcoal, till it begin to grow yellowiſh, and afterwards dip it in tallow (or, as ſome ſay, in water) and it will toughen it. Then having ſharpened the graver upon an oil-ſtone, ſtrike the point of it into a piece of hard box-wood, to take off the roughneſs about the points which was cauſed by whetting it upon the ſtone. In the laſt place, touch the edge of the graver with a file; if it cuts, it is too ſoft, and will not work; but if it will not touch it, it is fit for the work. If the point of the graver breaks, it is a ſign that it is tempered too hard; but it will frequently, after a little uſe by whetting, come to be well conditioned.

GRAVESEND, a port-town of Kent, ſituated on the ſouthern ſhore of the river Thames, twenty miles eaſt of London.

GRAVINA, a city and biſhop's ſee of the kingdom of Naples, twenty-ſeven miles ſouth-weſt of Barri: eaſt long. 17°, and north lat. 41°.

GRAVING, or ENGRAVING. See the article ENGRAVING.

GRAVING, in the ſea-language, is bringing a ſhip a-ground, and then burning off with furze, reed, or broom, all the filth and foulneſs that ſticks to her bottom without board, in order to pay her a-new.

GRAVITATION, in phyſiology, a ſpecies of attraction, or the tendency of one body towards another, in conſequence of its gravity. See the article ATTRACTION and GRAVITY.

Cauſe of GRAVITATION. This indeed is ſo difficult to be accounted for, that Sir Iſaac Newton himſelf is cautious how he does it. At the cloſe of his Principia he tells us, that he has not hitherto aſſigned the cauſe of gravity, which is a power, however, that proceeds from a cauſe reaching even to the centers of the ſun and planets, without loſing its virtue, and that acts, not according to the particles of the ſurface, like a mechanical cauſe, but according to the quantity of ſolid matter in bodies; its action being every way extended to immenſe diſtances, and always decreaſing in a duplicate proportion of them. The gravity of bodies towards the ſun, he further ſays, is compoſed of their gravity towards all its particles; and in going from the ſun, decreaſes exactly in a duplicate proportion of the diſtance to the orbit of ſaturn; and even the fartheſt aphelia of the comets, if thoſe aphelia are at reſt. But the reaſon of theſe properties of gravity, I could never hitherto, ſays Sir Iſaac, deduce from phænomena; and am unwilling to frame hypotheſes about them: for whatever is not deduced from phænomena, ought to be called an hypotheſes; and no ſort of hypotheſes are allowable in experimental philoſophy, wherein propoſitions are deduced from phænomena, and made general by induction. Thus the impenetrability, the mobility, the momentum of bodies, the laws of motion and gravity, were diſcovered; and it is enough that gravity has a real exiſtence, and acts according to ſuch laws as we have delivered, and that it ſuffices to produce all the motions of the celeſtial bodies, and of our ſea. See the articles PLANET, MOON, &c.

Laws of GRAVITATION are as follows: 1. It is common to all bodies, and mutual between them. 2. It is proportional to the quantity of matter in bodies. 3. It is exerted every way from the center of the attracting bodies in right-lined directions. 4. It decreaſes as the ſquares of

of the diftances increafe: thus, if a body at A (plate CXVIII. fig. 3.) on the earth's furface, diftant one femidiameter from the center C, weighs 36.00 pounds, it will, at the diftance of 2, 3, 4, 5, 6, femidiameters, weigh 9.00, 4.00, 2.25, 1.45, 1.00 pounds, which numbers decreafe as the fquares of the diftances increafe. The truth of this propofition is not to be had from experiments; the utmoft diftance we convey bodies to, from the furface of the earth, bearing no proportion to their diftance from its center, but is fufficiently clear from the motions obferved by the heavenly bodies. See the articles CENTRAL FORCES, COPERNICAN SYSTEM, &c.

Hence we learn, that all bodies have gravity, or are heavy, and that there is no fuch thing as abfolute levity in nature: and by the fecond law, the gravitation of all bodies is proportional to the quantity of matter they contain: and hence, fince bodies of equal bulk are found to have unequal quantities of matter, it evidently follows, that a vacuum, or folid, void of matter, muft neceffarily exift, and that an abfolute plenum is a doctrine unphilofophical, and equally falfe and abfurd. See the articles VACUUM and DENSITY.

Alfo from the third law it follows, that all bodies defcending freely by their gravity, tend towards the earth in right lines perpendicular to its furface, and with equal velocities, abating for the refiftance of the air; as is evident from the fecond law above. See the article DESCENT.

Again, fince the gravitation is always as the quantity of matter, and inverfely as the fquare of the diftance, it follows that were the internal parts of the earth a perfect void, or hollow concavity, a body placed any where therein, would be abfolutely light, or void of gravity: but fuppofing the earth a folid body throughout, the gravitation from the furface to the center will decreafe with the diftance, or it will be directly proportional to the diftance from the center.

Gravitation being found by many experiments and obfervations to affect all the matter of bodies equally, we have hence more reafon, fays Mr. Maclaurin, to conclude its univerfality, fince it appears to be a power that acts not only at the furfaces of bodies, and on fuch bodies as are removed at a diftance from them, but to penetrate into their fubftances, and into that of all other bodies, even to their centers, to affect their internal parts with the fame force as the external, to be obftructed in its action by no intervening body or obftacle, and to admit of no kind of variation in the fame matter, but from its different diftances only from that to which it gravitates.

This action of gravity on bodies arifes from its action on their parts, and is the aggregate of thefe actions; fo the gravitation of bodies muft arife from the gravity of all their particles towards each other. The weight of a body towards the earth, arifes from the gravity of the parts of that body: the gravity of a mountain towards the earth, arifes from the gravitation of all the parts of the mountain towards it; the gravitation of the northern hemifphere towards the fouthern, arifes from the gravitation of all its parts towards it; and if we fuppofe the earth divided into two unequal fegments, the gravitation of the greater towards the leffer, arifes from the gravitation of all the parts of the greater towards the leffer. In the fame manner the gravity of the whole earth, one particle being excepted, toward that particle muft arife from the quantity of gravitation of all the other particles of the earth towards that particle. Every particle, therefore, of the earth gravitates towards every other particle; and for the fame reafon every particle in the folar fyftem gravitates towards every other particle in it.

Center of GRAVITATION. See CENTER.

Line of GRAVITATION. See LINE.

Plane of GRAVITATION. See PLANE.

GRAVITY, in phyfiology, the natural tendency of bodies towards a center. See the article GRAVITATION.

From the two following obfervations we not only learn that gravity is univerfal and infeparable from all matter; but that it is an active principle, and the moft general for conferving and recruiting motion.

Gravity, fays Dr. Defaguliers, may be looked upon as a property of matter, which, though not effential is yet univerfal, and in one fenfe infeparable from it; that is, all parcels of matter, however modified, or all bodies, have a gravitation or attraction towards one another, as well in refpect of the heavenly as of the terreftrial bodies. The tendency of heavy bodies towards the center

center of the earth, being owing to the same cause that makes the sun and planets tend towards one another.

The *vis inertiæ*, says Sir Isaac Newton, is a passive principle by which most bodies persist in their motion or rest, receive motion in proportion to the force impressing it, and resist as much as they are resisted. By this principle alone there never could have been any motion in the world; some other principal was necessary for putting bodies into motion; for, from the various compositions of two motions, it is certain that there is not always the same quantity of motion in the world. But by reason of the tenacity of fluids, the attrition of their parts, and the weakness of elasticity in solids, motion is much more apt to be lost than got, and is always upon the decay. There is therefore a necessity of conserving and recruiting it, by active principles; and such is the cause of gravity, by which the planets and comets keep their motion in their orbs, and bodies acquire great motion in falling, &c.

The same philosopher observes, that bodies immersed in fluids have two kinds of gravity, the one absolute, and the other relative.

Absolute gravity is the whole force wherewith a body tends downwards; for the laws of which, see ACCELERATION, DESCENT, and GRAVITATION.

Relative gravity is the excess of gravity whereby a body tends downwards more than the fluid which surrounds it.

By the former kind of these gravities, says the last mentioned philosopher, the parts of fluids and of all bodies gravitate in their proper places, and by their joint weights compose the weight of the whole. For every whole has weight, as is evident in vessels filled with liquids; and the weight of the whole being equal to the weight of all the parts, must of necessity be composed of them. But bodies, by the latter kind of gravity, do not gravitate in their own places; that is, do not, when compared with one another, pregravitate; but mutually hindering each others endeavour to descend, they remain in their places as if they had no weight. Bodies in the air, which do not pregravitate, are thought by the vulgar not to be heavy, but those which pregravitate they judge to be heavy, so far as the air does not support them; so that the weight of bodies among the vulgar is only the excess of their real weight above that of the air. And therefore they call those things light, which, being less heavy than the air, and yielding to its greater gravity, mount upwards. But these bodies are only comparatively light, not really so: for they will descend in vacuo. Thus bodies, which by reason of their greater or less gravity descend or ascend in water, are but comparatively and apparently heavy or light, and their comparative and apparent levity is the excess or defect whereby their real gravity either exceeds or falls short of the gravity of water. But whatever bodies neither descend by pregravitating, nor ascend by yielding to one that pregravitates, though they still by their real weights increase the weight of the whole, yet comparatively, and in a popular sense, they do not weigh in water. Hence,

Specific GRAVITY, called also relative, comparative, and apparent gravity, is that by which one body is said to be heavier or lighter than another of a different kind: thus lead is said to be specifically heavier than cork because, supposing an equal bulk of each, the one would be heavier than the other.

From hence it follows, that a body specifically heavier than another, is also more dense; that is, contains a greater quantity of matter under the same bulk, because bodies weigh in proportion to the quantity of matter they contain.

If a solid be immersed in a fluid of the same specific gravity with itself, it will remain suspended therein in whatever part of the fluid it is put; but if the body is specifically heavier than the fluid, it will subside to the bottom. On the contrary, if the body is specifically lighter than the fluid, it will rise to the top.

A body being laid on the surface of a fluid specifically heavier than itself sinks in it, till the immersed part takes up the quantity of fluid, whose weight is equal to that of the whole body; and a body suspended in a fluid specifically lighter than itself, loses a part of its weight equal to that of a quantity of the fluid of the same bulk. See the article FLUID.

For the method of finding the various comparative or specific gravities of fluid and solid bodies to the last degree of accuracy, see the articles HYDROSTATICAL BALLANCE, and HYDROMETER.

We shall here subjoin a table of the specific gravities of metals, minerals, ores,

ores, ftones, foffils, animal fubftances, vegetable fubftances, mifcellaneous fubftances, and fluids, confidering rain-water as 1,000.

A Table of Specific GRAVITIES.

1. *Of Metals.*

Fine, or pure gold	19,640
Gold of a guinea of George II.	17,150
Gold of a moidore	17,140
Silver fine or pure	11,091
Silver of a fhilling of George II.	10,000
Lead	11,325
Copper	9,000
Brafs caft	7,850
wrought	8,000
Steel tempered	7,704
Iron	7,645
Tin	7,550

2. *Of mineral Ores, &c.*

Copper ore	3,775
Lead ore	6,800
Bifmuth	9,700
Turbith mineral	8,325
Antimony from Germany	4,000
from Hungary	4,700
Speltar	7,065

3. *Of Stones, Foffils, &c.*

Adamant or diamond	3,500
A pfeudo-topaz	2,672
hyacinth	2,631
jafper	2,666
A bohemian granate	4,360
A fwedifh granate	3,978
Onyx ftone	2,510
A cornelian	3,290
An englifh agate	2,512
A turcois ftone	2,508
Sardachates	3,595
A golden marcafite	4,589
Rock cryftal	2,659
Iceland cryftal	2,720
Lapis nephriticus	2,894
lazuli	3,054
hæmatites	4,360
calaminaris	5,000
judaicus	2,500
manati	2,270
amianthus or afbeftos, from Wales	2,913
Ditto from Italy	2,360
Glafs of the common fort	2,666
Flint	2,542
Black italian marble	2,704
White italian ditto	2,707
A fine marble	2,700
Another ditto from Italy	2,718
A pellucid pebble	2,641
A felenitis	2,322
Mundic, or gold fpar	4,430
Kidney ftone	3,600
Blue ftone	2,740
Star ftone	3,450
Hard paving ftone	2,460
Burford ftone	2,049
Alabafter	1,875
Rag ftone	2,470
Rotten ftone	1,980
Copperas ftone	4,300
Chalk	2,370
Slate	2,740
Oil ftone	2,380
A hone	2,388
China	2,270
Piece of brown ftone bottle	1,777
Piece of white ftone mug	2,250
Talc	2,657
of Venice	2,780
of Jamaica	3,000
Armenian bole or earth	2,727
Common fea coal	1,300
Magnet, or load-ftone of Penfylvania	4,585
Piece of ftonehenge very hard	2,618
ditto of a fofter fort	2,500
Briftol ftone	2,510

4. *Of Animal Subftances.*

Bone of an ox	1,656
Ivory	1,826
The tip of a rhinoceros's horn	1,242
of an ox-horn	1,689
of a ftag's horn	1,875
Calculus humanus	1,700
Ditto	1,240
Ditto	1,433
Ditto	1,660
Oyfter-fhell	2,892
Murex-fhell	2,590
A cockle-fhell	2,520
Mother of pearl	2,480
A piece of hard fifh-fkin	1,621
A piece of dried flefh of fifh	1,129
The quill part of a feather	1,330

5. *Of Vegetable Subftances.*

Dry box-wood	1,030
oak	0,925
elm	0,600
Afh, fappy	0,734
Ditto more dry about the heart	0,845
Dry mapple	0,755
fir	0,546
cedar	0,600
walnut-tree	0,631
yew	0,760
Beech, meanly dried	0,854
Crab-tree, meanly dried	0,765

Lignum

Lignum vitæ	1,327
nephriticum	1,200
aloes	1,177
brazilicum	1,030
rhodium	1,125
aſphaltum	1,179
guaiacum	1,337
Saſſafras wood	0,482
Red wood	1,031
ſantalum wood	1,128
White ditto	1,041
Citrine ditto	0,809
Speckled wood of Virginia	1,313
Maſtic wood	0,849
Ebony	1,177
Good wheat of the laſt year	0,757
Cork	0,240
White oats	0,472
Blue peaſe	0,795
White peaſe very dry	0,807
Barley of the laſt year	0,658
Malt made of the ſame	0,485
Field beans very dry	0,807
Wheaten meal unſifted	0,495
Rye meal unſifted	0,454
Wood aſhes	0,930

6. *Of Miſcellaneous Subſtances.*

Amber	1,040
Jet	1,238
Bezoar oriental	1,530
occidental	1,500
Sulphur common	1,800
vivum	2,000
Wood petrified	2,341
Borax	1,720
Coral, red	2,689
white	2,500
Corallachates	2,605
Cinnabar natural	7,300
artificial	8,200
of antimony	6,044
The reputed ſilver ore of Wales	7,464
The metal thence extracted	11,087
Ceruſe	3,156
Tartar crude	1,849
emetic	2,246
vitrioli	2,298
Cream of tartar	1,900
Camphire	0,996
Mercury crude	13,593
diſtilled once	13,570
ſublimed 511 times	14,110
Glaſs of antimony	5,280
Vitriol of Dantzick	1,715
Engliſh	1,880
white	1,900
Sal gemmæ	2,143
prunellæ	2,148
polycreſtum	2,141
Sal ammoniacum	1,453
Mirabile Glauberi	2,246
Salt of hartſhorn	1,496
Salt of vitriol	1,900
Alum	1,714
Nitre	1,900
Gum arabic	1,375
tragacanth	1,333
Myrrh	1,250
Verdigreaſe	1,714
Opium	1,363
Litharge of gold	6,000
of ſilver	6,044
Bees-wax, yellow	0,960
white	0,865
Pitch	1,150
Tutty	4,615
Honey	1,450
Roſin	1,100
Craſſamentum of the human blood	1,126
Serum of the human blood	1,030
Piece of petrified bone	1,895

7. *Of Fluids.*

Rain-water	1,000
Diſtilled water	0,993
Well or ſpring-water	0,999
River-water	1,009
Sea-water	1,030
Aqua fortis	1,300
regia	1,234
Oil of vitriol	1,700
cloves gilliflowers	1,034
amber	0,978
anniſeed	0,994
caraway-ſeed	0,940
linſeed	0,932
mint	0,975
Oil of olives	0,913
orange	0,888
origany	0,940
roſemary	0,934
ſaſſafras	1,094
ſpikenard	0,936
turpentine	0,792
Spirit of turpentine	0,874
wine rectified	0,866
Ethereal ſpirit of wine	0,732
Spirit of vitriol	1,203
amber	1,030
hartſhorn	1,073
urine	1,100
honey	0,895
nitre	1,315
ditto rectified	1,610
Sea-ſalt	1,130
tartar	1,073
Tincture of antimony	0,866
Butter of antimony	2,470
Balſam of Tolu	0,896

Lixivium

Lixivium of falt of tartar	1,550
Burgundy wine —	0,953
Canary —	1,033
Red-wine from Pontac —	0,993
White-wine vinegar —	1,011
Diftilled vinegar —	1,030
Milk of goats —	1,009
Cow's milk —	1,030
Urine —	1,030

Since all bodies are fubject to expand with heat, and be condenfed with cold, it will follow, that the fpecific gravities of bodies cannot be precifely the fame in fummer and winter. This was firft obferved in experiments by M. Homberg, and after him, by M. Eifenchmid, who found the abfolute weight of a cubic inch of feveral forts of bodies in fummer and winter, as in the table below.

	Summer.			Winter.		
	oz.	dr.	gr.	oz.	dr.	gr.
Brandy	0	4	32	0	4	42
Diftilled water	0	5	8	0	5	11
Spring-water	0	5	11	0	5	14
River-water	0	5	10	0	5	13
Spirit of nitre	0	6	24	0	6	44
fea-falt	0	5	49	0	5	55
vitriol	0	5	33	0	5	38
Oil of vitriol	0	7	59	0	7	71
Milk	0	5	20	0	5	25
Mercury	7	1	66	7	2	14
Vinegar	0	5	15	0	5	21
Ditto diftilled	0	5	11	0	5	15

GRAVITY, in mufic, an affection of found, whereby it is denominated deep or low. See the article SOUND.

Gravity ftands in oppofition to acutenefs, or that affection of found whereby it is denominated acute or fhrill. See the article ACUTE.

The relation of gravity and acutenefs is the principal thing concerned in mufic; the diftinctnefs and determinatenefs of which relation gives the found the denomination of harmonical and mufical.

The degrees of gravity, &c. depend on the nature of the fonorous body itelf, and the particular figure and quantity thereof. Though in fome cafes on the part of the body where it is ftruck.

Thus, *e.g.* the founds of two bells of different metals, of the fame fhape and dimenfions, being ftruck in the fame place will differ; and two bells of the fame metal will differ in found, if they differ in fhape and magnitude, or be ftruck in different places: fo in chords, all other things being equal, if they differ in tenfion, matter, or dimenfion, they will always differ in gravity. Thus again, the found of a piece of gold is much graver than that of a piece of filver of the fame fhape and dimenfions; and in this cafe the tones are, *cæteris paribus*, proportional to the fpecific gravities: fo a folid fphere of brafs, two feet diameter, will found graver than another of one foot diameter; and here the founds are proportional to the quantities of the matter, or abfolute weights.

But it muft be obferved, that acutenefs and gravity, as alfo loudnefs and flownefs are but relative things. We commonly call a found acute, or loud, in refpect of another which is grave or low in refpect of the former: fo that the fame found may be acute and grave, as alfo loud and low, in different comparifons.

The degrees of acutenefs and gravity make the different tones of a voice or found; fo we may fay one found is in tune with another, when they are in the fame degree of gravity.

The immediate caufe or means of this diverfity lies deep. The modern muficians fix it on the different velocities of the vibrations of the fonorous bodies.

If two or more founds are compared in relation of gravity, they are either equal or unequal in the degrees of tune: fuch as are equal are called unifons, and the unequal conftitute what we call an interval in mufic. See the articles UNISON, and INTERVAL.

GRAVY, in cookery, the juice of dreffed meat whether roafted, fried or boiled.

Gravy is obtained from beef, mutton, veal, poultry, and even fifh. The gravy of partridges, pullet, and other fowls, may be gotten by preffing them when about half roafted. The gravy of veal, beef, mutton, &c. is thus obtained: cut them in pieces, and putting them into an earthen pot, ftop it clofe by pafting the cover that no fteam may get out; then fet it on a gentle fire, for two hours, and the gravy will be made.

A fifh gravy for foop may be made of tench or eels, cleaned, and put into a kettle with water, falt, a bunch of fweet herbs, and an onion ftuck with cloves: let thefe boil for an hour and half; and ftraining off the liquor, thro' a clean linen cloth, add to it the peelings of mufhrooms, or mufhrooms themfelves cut fmall: boil

thefe

these together, and strain the liquor into a stew-pan, upon fried flour, and a little lemon-juice. This may serve for a foundation to all fish soups, and will keep good for some time.

GRAY, or GREY, in the manege, *&c.* See the article GREY.

GRAY, in zoology, an animal known among authors, by the name meles. See the article MELES.

GRAY, in geography a city of Franche Compte, in France, twenty-two miles north-west of Besançon: east long. 5° 32′, north lat. 47° 30′.

GRAYLING, in ichthyology, a species of coregonus, with the upper jaw longest, and with twenty-three bones in the back-fin. See the article COREGONUS.

GREASE, a swelling and gourdiness of the legs of a horse.

If the horse be full of flesh, the cure is to be begun by evacuation, such as bleeding, purging, *&c.* and keeping his heels as clean as possible, by washing them with warm water and soap; for nothing promotes the grease more than negligence and nastiness. In general, turning out in the day-time, moderate exercise, a large and convenient stall, with good dressing, are the best remedies; but if the grease be got to a great height, and there is a nauseous discharge, after cutting of the hair, and washing the heels with soap and water, bathe them with the following wound-water, pretty warm, twice a day, for three days. Take rock alum, and white vitriol, of each two ounces; powder them together, and burn them in a clean fire shovel, till they become a white calx: then take powdered camphire, one ounce; bole armenic in powder, two ounces; river or rain-water, two quarts. Make the water hot, and stir the other things into it. When you use it, it should be shaken up, and a little of it warmed in a pot, and the sores washed with a piece of spunge or rag.

GREASE, MOLTEN, a distemper incident to horses, in which the fat is melted by over hard riding or labour. It may be known by the horse's panting at the breast and girting-place, and heaving at the flank, which will be easily seen the night you bring him in, or the next morning.

For the cure, bleed him in the neck vein, to a good proportion; give him dried bran, and if he empties himself, a restringent glyster; but forbear giving him any hot drugs.

GREASE, with hunters, the fat of a boar, or hare; but the former has commonly the word bevy added to it, and is called bevy-grease.

GREAT, a term of comparison applied to things of extraordinary quantity or quality: thus, we say, a great city, a great genius, *&c.*

GREAT CIRCLES of the sphere. See the article CIRCLE.

GREAT-CIRCLE SAILING, the manner of conducting a ship in, or rather pretty near the arch of a great circle, that passes thro' the zenith of the two places, *viz.* from whence she came, and to which she is bound. See the article SAILING.

GREAT MEN, in law books, signify the lords of parliament, or other persons of note and distinction.

GREAT SEAL. See the article SEAL.

GREECE, the present Rumelia, and the antient Hellas, is situated between 20° and 26° east long. and between 36° and 44° north lat.

It reaches from the Adriatic Sea, eastward, to the Archipelago, and is generally a healthy and fruitful country.

GREEK, or GRECIAN, any thing belonging to antient Greece.

The greek language, as preserved in the writings of the celebrated authors of antiquity, as Homer, Hesiod, Demosthenes, Aristotle, Plato, Xenophon, *&c.* has a great variety of terms and expressions, suitable to the genius and occasions of a polite and learned people, who had a taste for arts and sciences. In it, proper names are significative; which is the reason that the modern languages borrow so many terms from it. When any new invention, instrument, machine, or the like, is discovered, recourse is generally had to the Greek for a name to it; the facility wherewith words are there compounded, affording such as will be expressive of its use: such are barometer, hygrometer, microscope, telescope, thermometer, *&c.* But of all sciences, medicine most abounds with such terms, as diaphoretic, diagnosis diarrhœa, hemorrhage, hydrophobia, phthisis, atrophy, *&c.* Besides the copiousness and significancy of the Greek, wherein it excels most, if not all, other languages, it has also three numbers, *viz.* a singular, dual, and plural; also abundance of tenses in its verbs, which makes a variety in discourse,

courfe, prevents a certain drinefs that always accompanies too great an uniformity, and renders that language peculiarly proper for all kinds of verfe. The ufe of the participles of the aorift and preterit, together with the compound words already mentioned, give it a peculiar force and brevity without taking any thing from its perfpicuity.

It is no eafy matter to affign the precife difference between the modern and antient Greek; which confifts in the terminations of the nouns, pronouns, verbs, *&c.* not unlike what obtains between fome of the dialects of the Italian or Spanifh. There are alfo in the modern Greek many new words, not to be met with in the antient. We may therefore diftinguifh three ages of the Greek tongue, the firft of which ends at the time when Conftantinople became the capital of the roman empire; the fecond lafted from that period to the taking of Conftantinople by the Turks; and the third, from that time to this.

GREEK BIBLE. See the article BIBLE.

GREEK CHURCH. See CHURCH.

GREEK MONKS and NUNS, of whatever order, confider St. Bafil as their founder and common father, and efteem it the higheft crime to deviate in the leaft from his conftitutions. There are feveral beautiful convents with churches, in which the monks perform divine fervice day and night. Some of the monks are cœnobites, or live together, wear the fame habit, eat at the fame table, and purfue the fame exercifes and employments: Thefe are of two forts; the one of the grand and angelical habit, being fuch as profefs to live more righteoufly than the reft; the other of the leffer habit, who do not pretend to lead fuch fanctified lives. Other monks again are anachorets. See the article ANACHORET.

GREEN, one of the original colours, excited by the rays of light. See COLOUR. Artificial greens, however, are rarely fimple colours, but produced by the mixture of yellow and blue: thus, two powders, one blue and the other yellow, appear perfectly green when mixed; tho' if viewed with a microfcope, the mixture will be feen chequered yellow and blue. See YELLOW and BLUE.

The dyers make divers fhades, or degrees, of green; all which are firft dyed in blue, and then taken down with woad, verdigreafe, *&c.* and afterwards greened with the weed, there being no one ingredient that will dye green alone. See the article DYEING.

GREEN, among painters. Gamboge will give five or fix forts of green with verdigreafe. But the yellow, which fome prefer before all others, is made of french berries; which is either deeper or fainter, according as the liquor is more or lefs ftained by them. In like manner, a yellow, drawn from the roots of the barberry or mulberry, will anfwer the fame purpofe, being mixed with tranfparent verdigreafe. As to verdigreafe itfelf, it produces a fine bluifh green, flows readily in the pencil, and may even ferve as an ink to write with; but is fubject to decay. Mountain-green is ufed for a grafs-colour. Verditer is a light green, feldom ufed but to colour landfkips that feem afar off. Sap-green is dark and dirty, and therefore never ufed but to fhadow other greens in the darkeft places. Copper-green is an excellent tranfparent and fhining grafs-green, if thickened in the fun-fhine, or over a gentle fire. It is the moft ufed of any green in wafhing of prints or maps.

GREEN-CLOTH, a board or court of juftice, held in the compting-houfe of the king's houfhold, compofed of the lord-fteward, and officers under him, who fit daily. To this court is committed the charge and overfight of the king's houfehold in matters of juftice and government, with a power to correct all offenders, and to maintain the peace of the verge, or jurifdiction of the court royal; which is every way about two hundred yards from the laft gate of the palace where his majefty refides.

It takes its name, board of green cloth, from a green cloth fpread over the board where they fit.

Without a warrant firft obtained from this court, none of the king's fervants can be arrefted for debt.

Clerks of the GREEN CLOTH, are two officers of the board of green-cloth who appoint the diet of the king and his houfehold, and keep all records, ledgers and papers relating thereto; make up bills, parcels and debentures for falaries, and provifions and neceffaries for the officers of the pantry, buttery, cellar, *&c.* They alfo wait upon foreign princes when entertained by his majefty.

GREEN-FINCH, in ornithology, the englifh name of the greenifh fringilla, with the wings and tail variegated with yellow. See the article FRINGILLA.

This

This bird is very frequent with us, and is a little larger than the chaffinch. See plate CXIX. fig. 1.

There is alſo a very beautiful green-finch brought from Surinam, with a red-head, and a roundiſh yellow ſpot near the joint of the wing. See *ibid.* fig. 2. where it is figured nearly of the bigneſs of life.

GREEN-HOUSE, or conſervatory, a houſe in a garden contrived for ſheltering and preſerving the moſt tender and curious exotic plants, which, in our climate, will not bear to be expoſed to the open air during the winter ſeaſon. Theſe are generally large and beautiful ſtructures, equally ornamental and uſeful. See plate CXX.

The length of theſe houſes, ſays Mr. Miller, muſt be proportioned to the number of plants they are to contain; but their depth ſhould never be greater than their height in the clear; which in ſmall or middling houſes may be fixteen or eigtheen feet, and in large ones from twenty to twenty-four. The windows in front ſhould extend from about one foot and a half above the pavement, to within the ſame diſtance of the cieling, which will admit of a corniche round the building, over the heads of the windows. In a ſmall green-houſe, the ſaſhes ſhould not be leſs than four or five feet broad, and in a large one, they ought not to exceed ſeven and a half, the ſhutters of which ought to fall back cloſe to the piers on the inſide, that when open, they may not prevent any of the rays of light from reaching the plants. The piers between theſe windows, which ſupport the building, ſhould be as narrow as poſſible, for which reaſon they ſhould either be of ſtone or of well-burnt brick. If they are of ſtone, they ought not to exceed two feet and a half in front, and ſhould be ſloped off backward to about eighteen inches broad, by which means the rays of the ſun will not be obſtructed by the corners of the piers; which they would be, if they were ſquare: but if they are built with brick, it will be proper to make them near three feet in front, otherwiſe, they will be too weak to ſupport the building: theſe ought alſo to be ſloped off in the manner directed for thoſe of ſtone.

Over the green-houſe there may be rooms for drying and preſerving ſeeds, roots, &c. and behind it, there may be erected a houſe for tools and other purpoſes; which will prevent the froſt from entering that way; ſo that the wall between them need not be more than two bricks and a half in thickneſs.

The floor of the green-houſe, which ſhould be laid either with marble, common ſtone, or broad tiles, muſt be raiſed two feet above the ſurface of the ground on which the houſe is placed: or if the ſituation be moiſt, at leaſt three feet; and if the whole be arched with low brick arches under the floor, it will be of great ſervice in preventing the damps riſing in winter. Under the floor, about three feet from the front, it will be adviſeable to make a flue of about ten inches in width, and two feet deep, to be carried the whole length of the houſe, which may be returned along the back part, and the ſmoke be carried up into funnels adjoining to the tool-houſe. The fire-place may be contrived at one end of the houſe; and the door at which the fuel is put in, as alſo the aſh-grate, may be contrived to enter into the tool-houſe, and the fuel being laid in the ſame place, the whole will be out of ſight. Fires, however, muſt be very ſparingly uſed in this place: not one winter in three or four will require them to be lighted, ſince this ought never to be done but when the froſt cannot well be kept out any other way, and when this is the caſe, this expedient may ſave a whole houſe of plants. Indeed the coldeſt weather cannot make it neceſſary for the green-houſe to be ſhut up cloſe for a long time together, which would be attended with very ill conſequences; for as it frequently happens, that in continued froſts, we have an hour or two of ſun-ſhine in the middle of the day, it will be of great ſervice to the plants if they are allowed to enjoy its rays thro' the glaſſes; but the window-ſhutters ſhould be cloſed again as ſoon as it is clouded. The inſide of the houſe ſhould either be white-waſhed, or painted white; for this colour reflects the rays of light in a greater quantity than any other.

In this green-houſe there ſhould be truſſels, upon which rows of planks ſhould be fixed, in order to hold the pots or tubs of plants, the foremoſt of which ſhould be placed four feet from the window, and the rows behind ſhould riſe gradually from the firſt, in ſuch a manner, that the heads of the ſecond row be entirely advanced above the firſt, the ſtems only being hid by it: and at the back-

side, there should be allowed at least a space of five feet, for the conveniency of watering the plants, and admitting a current of air round them: care should also be taken not to place the plants too close to each other, nor ever to place euphorbiums, sedums, torch-thistles, and other tender succulent plants, amongst oranges, myrtles, and other ever-greens. To avoid the inconvenience of placing plants of very different natures in the same house, it will be very proper to have two wings added to the main green-house, which, if placed in the manner of the annexed plan, will greatly add to the beauty of the building, and also collect a greater share of heat. In this plan the green house is supposed exactly to front the south, one of the wings to face the south-east, and the other the south-west: so that from the time of the sun's first appearance upon any part of the building, until it goes off at night, it will be constantly reflected from one part to the other, and the cold winds will be also kept off from the front of the main green-house. In the area may be placed many of the tender exotic plants, that will bear to be exposed in the summer season: and in the spring, before the weather will permit the plants to be set out, the beds and borders of this area may be full of anemonies, ranunculuses, tulips, *&c.*

In the annexed plate, A is the ground plan of the green-house; B B the ground plan of the two stoves. C C C the sheds behind the green-house and stoves. D D the passage of communication between the green house and stoves, where the stairs are placed which lead to the rooms over the green-house. E E the section of the flues in the back of the stoves, and F is the upright of the green house and stoves.

In the center of this area may be contrived a small bason for water, which will be very convenient for watering the plants; and the two wings of the buildings should be so contrived as to maintain plants of different degrees of hardiness, which should be effected by the situation and extent of the fire-place, and the manner of conducting the flues. These wings being, in the draught annexed, allowed sixty feet in length, may be divided in the middle by partitions of glass, with glass-doors, and to each of these there should be a fire-place, with flues carried up against the back-wall. The sloping glasses of these houses should be made to slide and take off, so that they may be drawn down more or less in warm weather, to admit air to the plants; and the upright glasses in front may be so contrived, as that every other may open as doors upon hinges, and the alternate glasses may be divided into two, the upper part of each to be drawn down like sashes, to let in the air.

If there are not sheds running behind the whole length of these wings, the walls should not be less than two bricks thick, and the back part having sloping roofs covered with tiles or slates, should be lined with reeds, *&c.* under the covering, in order to keep out the cold.

GREENLAND, or *West* GREENLAND, extends from the meridian of London to 50° west longitude, and from 60° to 80° north latitude.

The Danes have some colonies here, and pretend to the property of the whole. However, the Dutch make very free with the fishery on this coast, notwithstanding the representations, and even menaces of the Danes on that head.

East GREENLAND, or GROENLAND. See the article GROENLAND.

GREENWICH, a town of Kent, situated on the southern shore of the Thames, five miles east of London; remarkable for its royal and magnificent hospital, erected for decayed or disabled seamen, who have served their country; and for its palace, and most delightful park. See the article HOSPITAL.

On the top of a steep hill in the park, stands the royal observatory, built by Charles II. and furnished with all manner of instruments for astronomical observations, and a deep dry well for observing the stars by day.

GREGARIOUS, among zoologists, a term applied to such animals as do not live solitary, but in herds, flocks, or coveys.

GREGORIAN CALENDAR, that which shews the new and full moon, with the time of Easter, and the moveable feasts depending thereon, by means of epacts, disposed through the several months of the gregorian year. See CALENDAR and EPACT.

GREGORIAN CHANT. See the article CHANT.

GREGORIAN EPOCH, the epocha, or time whence the gregorian calendar or computation took place. The year 1754 is the 172 year of that epocha.

GREGORIAN YEAR, the Julian year corrected, or modelled, in such a manner as that

that three secular years, which in the Julian account are bissextile, are here common years, and only every fourth secular year is made a bissextile year. See the articles BISSEXTILE and YEAR.

The Julian computation is more than the solar year by eleven minutes, which in one hundred and thirty-one years amounts to a whole day. By this calculation, the vernal equinox was anticipated ten days from the time of the general council of Nice, held in the year 325 of the Christian æra, to the time of pope Gregory XIII. who therefore caused ten days to be taken out of the month of October, in 1582, to make the equinox fall on the twenty-first of March, as it did at the time of that council, and to prevent the like variation for the future, he ordered that three days should be abated in every four hundred years by reducing the leap year at the close of each century for three successive centuries to common years, and retaining the leap year at the close of each fourth century only. See JULIAN and EQUINOX.

This was at that time esteemed as exactly conformable to the true solar year, but it is found not to be strictly just, because that in four hundred years it gets one hour and twenty minutes, and consequently in 7200 years, a whole day.

The greatest part of Europe have long used the gregorian style: but Great Britain retained the julian till the year 1752, when by act of parliament this style was adjusted to the gregorian; since which time Sweden, Denmark, and other european states, who computed time by the julian account, have followed this example.

GRENADIER and GRENADO. See the articles GRANADIER and GRANADO.

GRENOBLE, a city of France, capital of Dauphiny, forty-five miles south-east of Lyons, and thirty-six miles south-west of Chamberry: east longitude 5° 28′, north latitude 45° 12′.

GRENOCK, or GREENOCK, a port-town of Scotland, near the mouth of the river Clyde; being the principal station for the herring fishery.

GRESHAM-COLLEGE. See COLLEGE.

GREVE, in our antient writers, a denomination of power and authority, signifying as much as *comes*, and *vice comes*, a sheriff; and according to Lambert, it is the same with reve. See the articles COUNT and REVE.

GREWIA, in botany, a genus of the gynandria-polyandria class of plants, the corolla whereof consists of five petals, of the form of the cup, but less, and emarginated at the base: the fruit is a quadrangular berry, containing four cells: the seeds are few, and of a globose figure.

GREWT, among miners, signifies earth of a different colour from the rest, found on the banks of rivers as they are searching for mines.

GREY, or GRAY, a mixed colour partaking of the two extremes, black and white. See the article COLOUR.

To dye a silver GREY. Take water a sufficient quantity; of galls bruised small, two ounces; tartar bruised, three ounces; boil them, and enter twenty yards of stuff or cloth, &c. handle and boil an hour and a half; cool it; then put in copperas a sufficient quantity; enter your cloth again at a boiling heat; handle it, boil a quarter of an hour, and so cool; if you would have it sadder, put in more copperas. See COLOUR and DYEING.

To dye a light GREY *colour*. Take water a sufficient quantity; nut galls bruised small, four ounces; white tartar bruised small, four ounces; make them boil, then enter twenty yards of broad-cloth, and handle it; boiling an hour and half, cool your cloth, and put in copperas an ounce and half; enter your cloth again, and handle it; boil it a quarter of an hour, and cool it; if you would have it sadder, put in more copperas.

To dye a dark GREY. For every pound of woollen ware, use a quarter of a pound of copperas, and a quarter of a pound of brown wood, or walnut-tree-wood. To finish it, take two ounces of brown wood, and half an ounce of copperas.

To dye stuff, &c. *a lavender* GREY. Heat a proper quantity of clean rain water in a kettle, and for every pound of stuff, take an ounce of blue lac, beaten small; and half an ounce of pounded galls, and the same quantity of vitriol: boil them together, and put in the stuffs; and boil them for half an hour. This dye is proper for slight ware, as stockings and coarse stuffs, but not for the better sort.

To dye silk a good GREY. This you may do as in the tawney dye, and after you have wrung out, rinsed, and beaten it, if it be browned, it becomes a good grey.

In the manege, they have several sorts of greys, as the branded-grey, which has spots quite black dispersed here and there; they have also the dapple-grey, the silver-grey, the iron-grey, &c.

GREY-HOUND. See the article HOUND.

GRIFFON, in heraldry, an imaginary animal, feigned by the antients to be half eagle and half lion; by this form they intended to give an idea of strength and swiftness joined together, with an extraordinary vigilance in guarding the things intrusted to its care. Thus the heathen naturalists persuaded the ignorant, that gold mines were guarded by these creatures with incredible watchfulness and resolution.

GRIG, a name given to the lesser ammodytes, or sand-eels. See AMMODYTES.

GRILLADE, in cookery, meat broiled on a gridiron.

GRIMBERG, a town of the austrian Netherlands, in the province of Brabant, five miles north of Brussels: east long. 4° 15′, north lat. 50° 55′.

GRIMPERG, a city of Germany, in the circle of the Lower Rhine, and earldom of Triers: east longitude 6° 35′, north latitude 49° 40′.

GRIMSBY, a borough and port-town of Lincolnshire, situated at the mouth of the Humber: east long. 4′, north lat. 53° 34′. It sends two members to parliament.

GRINDERS, *dentes molares*, in anatomy, *&c.* See TOOTH and MOLARES.

GRINDING, *trituratio*, the reducing hard substances to fine powders, either by the mortar, or by way of levigation upon a marble.

Grinding has a great share in some instances of raising or depressing the efficacy of what comes under its management: for in grinding, all those bodies whose efficacy consists in the peculiar shape and points of their components particles, the more and the finer they are broke, the less will they operate. Thus may calomel be rendered much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glass mortar; for the continual triture has the same effect upon it, as repeated sublimation, which is only breaking the saline spicula more and more, until it become almost plain mercury. But in resinous substances, particularly purgative ones, as jalap, scammony, *&c.* the finer the powder they are reduced to, the greater is likely to be their efficacy: for as the sense which the stomach and bowels have of them is in proportion to their contacts, therefore the more the quantity is divided, the farther will it diffuse itself, and vellicate the fibres; that is, it will work the more.

GRINDING is also the rubbing or the wearing off the irregular or otherwise redundant parts of the surface of a body, and reducing it to the destined figure, whether that be flat, concave, or the like.

Method of GRINDING *optic glasses.* Mr. Huygens directs, in general, to make the breadth of the concave tool, plate, dish, or form, in which an object-glass must be ground, almost three times the breadth of the glass. Though in another place he speaks of grinding a glass whose focal distance was 200 feet, and breadth 8 ½ inches, in a plate only fifteen inches broad. But for eye-glasses, and others of lesser spheres, the tools must be broader in proportion to the breadth of these glasses, to afford room enough for the motion of the hand in polishing. Mr. Huygens made his tools of copper, or of cast brass, which, for fear they should change their figure by bending, can hardly be cast too thick: however, he found by experience, that a tool fourteen inches broad, and half an inch thick, was strong enough for the forming glasses to a sphere of thirty-six feet diameter; when the tool was strongly cemented upon a cylindrical stone an inch thick, with hard cement made of pitch and ashes.

In order to make moulds for casting such tools as are pretty much concave, he directs that wooden patterns should be turned in a lathe, a little thicker and broader than the tools themselves; but for tools that belong to spheres above twenty or thirty feet diameter, he says it is sufficient to make use of flat boards turned circular to the breadth and thickness required. When the plates are cast, they must be turned in a lathe exactly to the concavity required; and for this purpose it is requisite to make a couple of brass-gages in the manner following, according to the direction of Mr. Molyneux.

Take a wooden pole, a little longer than the radius of the spherical surface of the glass to be formed; and through the ends of it strike two small steel points, at a distance from each other equal to the radius of the sphere intended; and by one of the points hang up the pole against a wall, so that this upper point may have a circular motion in a hole or socket made of brass or iron, fixt firmly to the wall. Then take two equal plates of brass or copper, well hammered and smoothed, whose length is somewhat more

more than the breadth of the tool of caft brafs, whofe thicknefs may be about a tenth or a twelfth of an inch, and whofe breadth may be two or three inches. Then having faftened thefe plates flat againft the wall in a horizontal pofition, with the moveable point in the pole, ftrike a true arch upon each of them. Then file away the brafs on one fide exactly to the arch ftruck, fo as to make one of the brafs edges convex, and the other concave; and to make the arches correfpond more exactly, fix one of the plates flat upon a table, and grind the other againft it with emery. Thefe are the gages to be made ufe of in turning the brafs tools exactly to the fphere required.

But if the radius of the fphere be very great, Mr. Huygens directs the gages to be made as follows. Imagine the line AE, (plate CXVIII. fig. 4. n° 1.) drawn upon the brafs plate to be the tangent of the required arch AFB, whofe radius, for example, is 36 feet, and diameter 72. From A fet off the parts AE, EE, &c. feverally equal to an inch, and let them be continued a little beyond half the breadth of the tool required: then as 72 feet, or 864 inches is to 1 inch, fo let 1 inch be to a fourth number: this will be the number of decimal parts of an inch in the firft line EF, reckoning from A. Multiply this fourth number fucceffively by 4, 9, 16, 25, &c. the fquares of 2, 3, 4, 5, &c. and the feveral products will be the number of parts contained in the 2d, 3d, 4th, 5th, EF refpectively. But becaufe thefe numbers of parts are too fmall to be taken from a fcale by a pair of compaffes, fubftract them feverally from one inch, reprefented by the lines EG, and the remainders being taken from a fcale of an inch divided into decimal parts, and transferred by the compaffes from G to F, will determine the points F, F, &c. of the arch required. And the fame being done on the other fide of the line AD, the brafs plates muft be filed away exactly to the points of this arch, aud polifhed as before.

Mr. Huygens would have his plates or tools firft formed in a turning lathe, and then ground together with emery; that is to fay, the concave and convex tool of the fame fphere together: but the tools of very large fpheres, he would have ground at firft quite plane, by a ftone-cutter; and then ground hollow with a round flat ftone and emery, to the defired gage.

The tools thus ground muft be polifhed by an incruftation of pitch and emery, and perfected with blue hones. See the article POLISHING.

The glafs being planed to an equal thicknefs, and polifhed a little by a glafs grinder, and rounded by a grind-ftone, take away the plate with feveral fteel cavities, and with fome fifted emery, made into a cement, fix on a fmaller round piece of brafs, or rather fteel, truly flat, and turned, about the bignefs of a farthing, but thicker, having firft made in the center thereof, with a triangular fteel punch, a hole about the bignefs of a goofe-quill, and about the depth of $\frac{1}{12}$ of an inch; and at the very bottom of this triangular hole, a little round hole muft be punched fomewhat deeper, with a very fmall fteel punch. A fmall fteel point, of about an inch long, muft be truly fhaped and fitted to this triangular hole, and at the very apex to the fmall round deep impreffion. Neverthelefs it muft not be fitted fo exactly, but that it may have the liberty to move a little to and fro; the apex always continuing to prefs upon the furface of the round hole below. This fteel triangular point muft be fixed to the end of a pole; to the other end of which another round iron point muft be fixed, of about five or fix inches long, to play freely up and down in a round hole in a piece of brafs let into a board fixed againft the ceiling for that purpofe, perpendicularly over the bench and over the center of the tool, which muft be ftrongly and truly fixed horizontally thereon, as reprefented in plate CXVIII. fig. 4. n° 2. Having thefe things prepared, with fome pots of emery of various fineneffes, take of your roughest fort a fmall half pugil, wetting the fame, and daubing it pretty equably on the tool; then lay on your glafs, and fix up your pole, and continue to grind for a quarter of an hour; not preffing upon the pole, but barely carrying the glafs round thereby: then take a little quantity of fome finer emery, and work another quarter of an hour therewith: then take the like quantity of emery ftill finer, and work for the fame time: laft of all take a lefs quantity of fome of the very fineft you have, which will be fufficient for a glafs of five inches diameter, and work therewith for an hour and a half; taking away by little and little fome of the emery with a wet fponge,

fponge. Do not keep it too wet nor too dry, but about the confiftence of pap: for much depends on this. If it be too dry, your emery will ftick, clog, and incorporate, and cut little or none at all, befides it will fcratch and cut your glafs irregularly; and if it is too wet, and too much diluted, it will, from the irregular feparation of its parts, cut in fome places more than others, as in the other cafe.

But Mr. Huygens tells us, that this method of ufing various forts of frefh emery is not good; finding by experience, that the furfaces of large glaffes are often fcratched. And therefore he fays, that it is beft to take a large quantity of the firft and fecond emery, and fo work with the fame from the firft to the laft, taking away, by little and little, every half hour, or quarter of an hour, more and more of the emery with a wet fponge, by which means he could bring the glafs extremely fmooth and fine, fo as to fee pretty diftinctly a candle or the fafh-windows well defined through it, which is a mark when it is ground enough to receive a polifh.

When you firft begin to grind, and the emery begins to be fmooth, the glafs will ftick a little to the tool, and run ftiff; then frefh emery is to be added. The method hitherto defcribed of grinding with emery, is what is recommended by Mr. Huygens. Le Pere Cherubin prefcribes another material, which is the grit of a hard grind-ftone, well beaten into a fine powder, and fifted pretty fine: and here in England the fame thing was ufed to be performed by Mr. Cox with common clean white fand, taking away by little and little the faid grit and fand, as it is ground finer and finer; but it feems this method is now quite difufed.

The method of GRINDING *plate glafs.* See the article GLASS.

GRINDSTEAD, or *Eaft* GRINSTEAD, a borough-town of Suffex, twenty-four miles directly fouth of London, which fends two members to parliament.

GRIPE, or GRIPES, in medicine, a fort of colic, or painful diforder of the belly. See the article COLIC.

GRIPE, or GRIP, in hufbandry, a fmall ditch cut acrofs a meadow, or plowed land, in order to drain it.

GRIPE, in the fea-language, is a piece of timber fayed againft the lower piece of the ftern, from the fore-maft end of the keel, joining with the knee of the head: its ufe is to defend the lower part of the ftern from any injury; but it is often made the larger, to make the fhip keep a good wind.

Gripe of a fhip, is alfo the compafs or fharpnefs of the ftern under water, chiefly towards the bottom of it.

Gripe is alfo a fea-term, for a fhip's turning her head more to the wind than fhe fhould; this is caufed either by overloading her a-head, the weight of which preffes her down, fo that fhe will not readily fall off from the wind; or by ftaying or fetting her mafts too much aft: which is always a fault in fhort fhips that draw much water, fince it caufes them to be continually running into the wind: though in floating fhips, if the mafts be not ftayed very far aft, they will never keep a good wind.

GRIPSWALD, a town of Germany, in the circle of Upper Saxony, and province of fwedifh Pomerania, fituated on a bay of the Baltic fea: eaft long. 13° 40', north lat. 54° 15'.

GRISLAGINE, in ichthyology, a fpecies of cyprinus, with whitifh fins, and eleven rays in that befide the anus.

GRISLEA, in botany, a genus of the octandria-monogynia clafs of plants, the flower of which confifts of four extremely minute petals, of an oval figure, arifing from the denticulations of the cup, and fcarce larger than they. It is an american tree, fufficiently diftinguifhed by its flower alone.

GRISONS, allies of Switzerland; their country is almoft of a circular form, about fixty miles over every way, and is bounded on the north by Tyrol and part of Switzerland; on the eaft, by Tyrol and Trent; on the fouth, by Italy; and by the Swifs cantons on the weft.

GRIST, in country-affairs, denotes corn ground, or ready for grinding. See the articles CORN and MILL.

GRITH, a faxon word fignifying peace; from whence grithbreche is ufed in law-books for the breach of the peace.

GRITS, *faburræ.* See the article SABURRÆ.

GROANING, or HOOTING, among fportfmen, the cry or noife of a buck in rutting time.

GROAT, an englifh money of account, equal to four-pence.

GROATS, in country-affairs, oats after the hulls are off, or great oat-meal.

GROCERS, antiently were fuch perfons as engroffed all merchandize that was vendible; but now they are incorporated,

rated, and make one of the companies of the city of London, which deals in fugar, foreign fruits, fpices, &c.

GRODNO, a great city of Poland, in the province of Lithuania: eaft long. 24°, north lat. 53° 40′.

GROENDALE, a town of Brabant, fix miles fouth-eaft of Bruffels.

GROENLAND, or SPITZBERGEN, a cold miferable country without inhabitants, and with very few animals or vegetables, fituated between 10° and 30° eaft long. and between 77° and 82° north lat.

GROGRAM, a kind of ftuff, made of filk and mohair. Turky grograms pay on importation $8\frac{66\frac{1}{4}}{100}$d. the yard; and draw back, on being exported, $7\frac{50\frac{3}{4}}{100}$d. Lifle grograms, if narrow, pay 11 s. $6\frac{60}{100}$d. each piece, not exceeding 15 yards, and draw back 10s. $1\frac{1}{2}$d. but if broad they pay 17s. $3\frac{90}{100}$d. and draw back 15s. $2\frac{25}{100}$d. each piece, not exceeding 15 yards.

GROIN, *pubes*, in anatomy. See the article PUBES.

GROLL, a town of Guilderland, twenty-one miles eaft of Zutphen.

GROMETS, in the fea-language, fmall rings formerly faftened with ftaples to the yards, to make faft the gafkets, but now never ufed.

GRONINGEN, the capital of a province of the fame name, which makes one of the feven united provinces: eaft long. 6° 40′, north lat. 53° 20′.

GRONOVIA, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which confifts of five extremely fmall petals, of a roundifh figure: the fruit is a roundifh, coloured capfule, with only one cell, in which is contained a fingle, large, and roundifh feed.

GROOM, a name particularly applied to feveral fuperior officers belonging to the king's houfhold, as groom of the chamber, groom of the ftole. See the article STOLE.

GROOM-PORTER, an officer of the king's houfhold, who provides chairs, ftools, and firing for the king's lodging, and alfo furnifhes cards, dice, &c. and decides the difputes which arife at play.

GROOM is more particularly ufed for a fervant appointed to attend on horfes in the ftable. It is his bufinefs to feed and water them, to curry and rub them down, and to keep a watchful eye over them, that they may have no inward or outward diforder, without his difcovering it, and ufing his endeavours to remove it.

GROOVE, among miners, is the fhaft or pit funk into the earth, fometimes in the vein, and fometimes not.

GROOVE, among joiners, the channel made by their plough in the edge of a moulding, ftyle, or rail, to put their pannels in, in wainfcotting.

GROOVE alfo denotes a gardener's tool for tranfplanting plants.

GROSS, in law-books, fignifies abfolute or independent on another: thus, an advowfon in grofs, is one diftinct and feparate from the manor.

GROSS alfo denotes the quantity of twelve dozen, of things fold by tale.

GROSS BEAK, in ornithology, the englifh name of a bird called by authors loxia. See the article LOXIA.

GROSS WEIGHT, the whole weight of merchandizes, with their duft and drofs: as alfo the bag or cheft wherein they are contained. An allowance is ufually made out of the grofs-weight for tare and tret. See the article TARE.

GROSS-BOIS, in our old law-books, fignifies wood of fuch a growth as to be accounted timber. See TIMBER.

GROSSETTA, a city of Tufcany, in Italy, fifty-five miles fouth of Florence: eaft long. 12°, north lat. 42° 40′.

GROSSULARIA, the GOOSEBERRY and CURRANT-BUSHES, the fame with the ribes of Linnæus. See the articles RIBES, GOOSEBERRY, &c.

GROTESQUE, or GROTESK, in fculpture and painting, fomething whimfical, extravagant and monftrous; confifting either of things that are merely imaginary, and have no exiftence in nature; or of things fo diftorted, as to raife furprize and ridicule.

Grotefque work is the fame with what is fometimes called antique. The name is faid to have taken its rife from the figures of this kind much ufed in adorning the grottos which in antient times were the tombs of eminent perfons or families; fuch as that of Ovid, whofe grotto was difcovered near Rome about eighty years ago.

GROTESQUES, or GROTESKS, are particularly ufed to fignify thofe fanciful ornaments of animals interfperfed among foliages, fruit, &c. as thofe painted by Raphael Urbine in the Vatican, and thofe carved by Michael Angelo, in the cieling of the portico of the capitol. Thefe

kind

kind of compartments are called by Vitruvius, harpagenitulі.

GROTSKA, a city of Silesia, and capital of a dutchy of the same name, thirty miles south of Breslaw: east long. 17°, north lat. 50° 40′.

GROTSKA is also a town of Servia, in european Turky, twenty miles south-east of Belgrade: east long. 21°, north lat. 45°.

GROTTO, in the natural history of the earth, a large deep cavern or den in a mountain or rock.

Of these we find several remarkable ones in different parts of the world. The most celebrated one of our own country, is that called Ookley-hole, on the south side of Mendip-hills. Its length is about two hundred yards, and its height various; being in some places very low, and in others eight fathoms. There is another at Puzzoli, about four leagues from Naples, called the dog's grotto; because a dog thrown into it is immediately killed, by a destructive vapour equally fatal to all animals within its reach. The milky grotto, *crypta lactea*, about a mile from the antient village of Bethlehem, is said to have been thus called from the holy virgin's letting fall some drops of her milk in it; on which account the earth of this cavern has been supposed to possess the virtue of restoring womens milk.

GROTTO is also used for a small artificial edifice made in a garden, in imitation of a natural grotto.

The outsides of these grottos are usually adorned with rustic architecture, and their inside with shell-work, coral, &c. and also furnished with various fountains, and other ornaments.

The following is recommended as a good cement for grotto-work. Take two parts of white rosin, melt it clear, add to it four parts of bees-wax; when melted together, add some flower of the stone you design to cement, two or three parts, or so much as will give the cement the colour of the stone; to this add one part of the flower of sulphur: first incorporate all together over a gentle fire, and afterwards knead it with your hands in warm water. With this fasten the stones, shells, &c. after they are well dried, and warmed before the fire.

GROVE, in gardening, a small wood impervious to the rays of the sun.

Groves are not only great ornaments to gardens, but are also the greatest relief against the violent heats of the sun, affording shade to walk under in the hottest parts of the day, when the other parts of the garden are useless; so that every garden is defective which has not shade. See the article GARDEN.

Groves are of two sorts, *viz.* either open or close. Open groves are such as have large shady trees which stand at such distances, as that their branches approach so near to each other, as to prevent the rays of the sun from penetrating through them.

Most of the groves that have been planted either in England or in the celebrated gardens of France, are only a few regular lines of trees; many of which are avenues to the habitation, or lead to some building or other object: but these do not appear so grand, as those that have been made in woods, where the trees have grown at irregular distances: where they have large spreading heads, and are left so far asunder, as to permit the grass to grow under them, they then afford the greatest pleasure; for nothing is more noble than fine spreading trees, with large stems, growing through grass, especially if the grass is well kept, and has a good verdure; besides, most of those planted groves have a gravel walk, made in a straight line between them, which greatly offends the sight of persons who have a true taste: therefore whenever a gravel-walk is absolutely necessary to be carried through these groves, it will be much better to twist it about, according as the trees naturally stand, than to attempt regularity: but dry walks under large trees, are not so useful as in open places; because after rain, the dropping of the trees will, for a considerable time, render the walks useless.

In planting groves, it is much the best way to dispose the trees irregularly, which will give them a more magnificent and noble appearance, and also form a shade sooner than when the trees are planted in lines.

When, in planting a garden, full grown trees are found upon the spot, they should, if possible, remain inviolate; for it will be better to put up with many inconveniencies, than to destroy what will require an age to retrieve; so that nothing but offending the habitation, by being so near as to occasion great damps, should tempt us to cut them down.

Close groves have frequently large trees standing in them; but the ground under these are filled with shrubs or underwood;

wood; so that the walks which are in them are private, and screened from winds; by which means they are rendered agreeable for walking, at such times when the air is either too hot or too cold for walking in the more exposed parts of the garden. These are often contrived so as to bound the open groves, and frequently to hide the walls or other inclosures of the garden; and when they are properly laid out, with dry walks winding through them, and on the sides of these sweet-smelling shrubs and flowers irregularly planted, they have a charming effect: for here a person may walk in private, sheltered from the inclemency of cold or violent winds, and enjoy the sweets of the vegetable kingdom: therefore, when it can be admitted, if they are continued round the whole inclosure of the garden, there will be a much greater extent of walk; and these shrubs will appear the best boundary, where there are not fine prospects to be gained.

GROUND, in agriculture, is much the same with earth or soil.

GROUND, in painting, the surface upon which the figures and other objects are represented.

The ground is properly understood of such parts of the piece, as have nothing painted on them, but retain the original colours upon which the other colours are applied to make the representations.

A building is said to serve as a ground to a figure, when the figure is painted on the building.

The ground behind a picture in miniature, is commonly blue or crimson, imitating a curtain of sattin or velvet; if it be to be blue, it should be laid on as follows: wash bice till it is very pure and clear, and temper a quantity in a shell sufficient for your ground, letting it be thoroughly moist and well bound with gum. Then with a small pencil lay on the same colour about the pourfile, that is, the ambient superficies of the picture; having done this, take a large pencil, and wash over the whole ground you design to cover with a blue, somewhat thin and waterish, and then with a pretty large pencil, full of colour and flowing, lay over with a thick and substantial colour what you had before only washed over; in the doing of this you must be very quick, keeping the colour you have laid on moist, and not suffering any part to dry till you have covered the whole.

If you would have your ground a crimson like sattin, then trace out where and in what places you will have those strong and hard lights and reflections to fall, which are seen in sattin or velvet, with indian lake; there lay your lights with a lake that is thin and waterish, and while it is yet wet, lay the deepening and hard strong shadows with a stronger and darker colour of lake thick ground, close by the other lights. The best way for imitation, is to have a piece of sattin before you to imitate.

GROUND, in etching, denotes a gumous composition smeared over the surface of the metal to be etched, to prevent the aquafortis from eating, except in such places where this ground is cut through with the point of a needle. See the article ETCHING.

GROUND *of a shield*, the same with field. See the article FIELD.

Fast GROUND, or SHELF. See SHELF.

GROUND-ANGLING, fishing under water without a float, only with a plumb of lead or a bullet, which is better, because it will roll on the ground; this method of fishing is most proper in cold weather, when the fish swim very low.

The bullet is to be placed about nine inches from the baited hook. A person in fishing in this manner, ought not to strike as soon as he feels the fish bite, but slack his line, that the fish may the better swallow the bait and hook. As for the tackle, it should be fine and slender; for strong and thick lines only serve to fright the fish.

The morning and evening are the chief seasons for the ground-line in fishing for trout; but if the day prove cloudy, or the water muddy, you may fish at ground all day.

GROUND-PLUMING, is to find out the depth of the water in fishing; which is done by a musket-bullet with an hole through it, tied to a strong twist and hung on the hook.

GROUND-IVY, *hedera terrestris*, in botany. See the article GLECHOMA.

Ground-ivy is attenuant and dissolvent, and famous both internally and externally as a vulnerary. It is much used with us in an infusion in form of tea, for disorders of the breast and lungs, and is sometimes an ingredient in pectoral decoctions. A conserve made of the plant when in flower, retains its virtues in an agreeable form, but is seldom kept in the shops. It is esteemed a specific in ero-

fions and exulcerations of the vifcera, and particularly of the kidneys and lungs. It is alfo recommended in confumptions, bruifes from falls, head-achs, and other the like diforders.

GROUND PINE, in botany, a plant called by authors chamæpitys, or teucrium. See the article TEUCRIUM.

Stinking GROUND-PINE, in botany. See the article POLYCNEMUM.

GROUND TACKLE, is a fhip's anchors, cables, *&c.* and, in general, whatever is neceffary to make her ride fafe at anchor.

GROUND-TIMBERS, are thofe timbers in the fhip which lie on her keel, and are faftened to it with bolts thro' the keelfon. They are fo called from the fhip's refting upon them when fhe is aground.

GROUND-TOWS, are what comes from the hemp when dreffed at the hatchel for the fpinners, and out of which hamburgh or cabbin-lines, marlin, and white ocham are made.

GROUND-WORK, in a building, the fame with foundation. See FOUNDATION.

GROUNDAGE, a cuftom or tribute paid for the ground on which a fhip ftands in port.

GROUNDING, is bringing a fhip on ground to be cleaned, trimmed, or to have a leak ftopped.

GROUNDLING, in ichthyology, the fmooth, fpotted cobitis, with the body of a cylindrical figure, and otherwife called the loach. See COBITIS.

GROUNDSEL, *fenecio*, in botany, *&c.* See the article SENECIO.

GROUP, in painting and fculpture, is an affemblage of two or more figures of men, beafts, fruits, or the like, which have fome apparent relation to each other.

It is neceffary in a good piece of painting, that all the figures be divided into groups: this has fomewhat in it of the nature of fymphony or concert of voices; for as in the one the voices muft fuftain each other, in order to fill the ear with an agreeable harmony from the whole; fo in groups, if the parts or figures be not well difpofed, fomething will be found difagreeable.

There are two kinds of groups, or two manners of confidering them, with refpect to the defign, and to the clair-obfcure. The firft of thefe is common both to works of painting and fculpture; but the latter is peculiar to painting.

Groups, with refpect to the defign, are combinations of feveral figures, which bear a relation to each other, either upon account of the action, or of their proximity, or of the effect they produce. Thefe we conceive as reprefenting fo many different fubjects, or at leaft fo many diftinct parts or members of one great fubject. Thus, in architecture, we fay a group of columns, when we fpeak of three or four columns ftanding together on the fame pedeftal.

Groups, with refpect to the clair-obfcure, are affemblages of figures, where the lights and fhadows are diffufed in fuch a manner, that they ftrike the eye together, and naturally lead it to confider them in one view.

GROUP, in mufic, one of the kinds of diminutions of long notes, which, in working, form a fort of group, knot, or bufh. It ufually confifts of four or more crotchets, quavers, *&c.* tied together at the difcretion of the compofer.

GROUPADE, or CROUPADE, in the manege. See the article CROUPADE.

GROUPED COLUMN. See COLUMN.

GROUSE, or GROWSE, a fpecies of the tetrao, is a valuable bird of the fize of a well-grown fowl; the head is large; the eyes bright and piercing; the ears are patulous, the beak is three quarters of an inch long, and of a pale colour, fomewhat hooked, and pointed at the extremity: it has a fcarlet protuberance over the eyes, which is very bright and beautiful; its wings are variegated, and its tail forked. The male, excepting the little variegations of white in his wings, is totally black, and there is a fine changeable tinge of a deep blue on his neck; but the female is brown and mottled, and in colour refembles the woodcock.

This is a native of England, but is not very frequent; it lives on large mountainous heaths.

GROWAN, among the miners of Cornwal, a coarfe gritty ftone, of a greyifh colour, which they are often obliged to dig through, before they can reach the ore.

GROYNE, or CORUNNA, a port of Spain. See the article CORUNNA.

GRUB, in zoology, the englifh name of the hexapode worms, produced from the eggs of beetles, and which at length are transformed into winged infects of the fame fpecies with their parents. See the article SCARABÆUS.

GRUBS, in medicine, certain unctuous pimples rifing in different parts of the face,

face, but chiefly in the alæ of the noſe. The cure of theſe ought only to be attempted by evacuations and cleanſers of the blood.

GRUBBING, in agriculture, the digging or pulling up the ſtubs and roots of trees.

When the roots are large, this is a very troubleſome and laborious taſk; but Mr. Mortimer has ſhewn how it may be accompliſhed ſo as to ſave great expence by a very ſimple and eaſy method. He propoſes a ſtrong iron-hook to be made, about two feet four inches long, with a large iron-ring faſtened to the upper part of it. See plate CXXI. fig. 2. This hook muſt be put into a hole on the ſide of the root, to which it muſt be faſtened, and a lever being put into the ring, two or three men, by means of this lever, may wring out the root, and twiſt the ſap-roots aſunder. Stubs of trees may alſo be taken up with the ſame hook, in which work it will ſave a great deal of labour, though not ſo much as in the other, becauſe the ſtubs muſt be firſt cleft with wedges before the hook can enter the ſides of them, to wrench them out by pieces.

GRUBBING *a cock*, with cock-fighters, a term uſed for cutting off the feathers under his wings.

This is a thing not allowed by cockpit-law, nor is any one permitted to cut off the feathers in any handling place.

GRUBENHAGEN, a town and caſtle of lower Saxony and dutchy of Brunſwic, remarkable for its mines of ſilver, copper, iron, and lead: eaſt long. 9° 36′, and north lat. 51° 45′.

GRUME, *grumus*, in medicine, denotes a concreted clot of blood, milk, or other ſubſtance. Hence grumous blood is that which approaches to the nature of grume, and by its viſcidity, and ſtagnating in the capillary veſſels, produces ſeveral diſorders.

GRUMOSE ROOTS, among herbaliſts, ſuch as are knotty, and faſtened to one head, like thoſe of celandine and anemonies. See the article ROOT.

GRUS, the CRANE, in ornithology, a bird of the ardea or heron-kind. See the article ARDEA.

The common crane, or ardea with the top of the head papilloſe, is a large, ſtately, and beautiful bird, with a very long neck. The indian crane, with the whole upper part of the head papilloſe, is ſmaller than the european or common kind, but otherwiſe very like it. See the article CRANE.

GRUS, in antiquity, a kind of dance which the young Athenians performed every year at Delphos, about the altar of Apollo, on the day of Delia.

The ſteps and figures of this dance, which were intricate and running one into another, were deſigned to expreſs the turnings and windings of the labyrinth in which Theſeus killed the minotaur.

GRY, a meaſure containing one tenth of a line. See the article LINE.

GRYGALLUS, in ornithology, a name given to the urogallus, or tetrao. See the article TETRAO.

GRYLLO-TALPA, the MOLE-CRICKET, a ſpecies of gryllus, with the anterior feet palmated. See the next article.

This is the largeſt of all the european winged inſects, being two inches and an half in length, and three quarters of an inch in diameter. Its colour is a duſky-brown, and there grow from the extremity of the tail, on each ſide, two hairy bodies reſembling in ſome degree the tail of a mouſe. See plate CXXI. fig. 4.

GRYLLUS, in zoology, the name of the cricket and locuſt-kind, which, together with the graſshoppers, make only one genus of inſects, the characters of which are theſe: the antennæ are ſetaceous; the exterior wings are membranaceous, narrow, and have much of the appearance of the wings of ſome of the fly-kind; the thorax is compreſſed and angulated; and the legs are formed for leaping. See the articles LOCUST and GRYLLO-TALPA.

GRYLLUS, in ichthyology, a name given to two diſtinct fiſhes, the conger-eel and ophidion. See the articles CONGER and OPHIDION.

GRYPHITES, in natural hiſtory, in engliſh CROW'S STONE, an oblong foſſile ſhell, very narrow at the head, and becoming gradually wider to the extremity, where it ends in a circular limb; the head or beak of this is very hooked or bent inward.

They are frequently found in our gravel or clay-pits, in many counties. There are three or four diſtinct ſpecies of them; ſome are extremely rounded and convex on the back, others leſs ſo; and the plates of which they are compoſed, are in ſome ſmaller and thinner, in others thicker and larger, in ſpecimens of the ſame bigneſs. See plate CXXIV. fig. 2.

GRYPHUS, a kind of ænigma. See the article ÆNIGMA.

GUADALAJARA, a city of Mexico, in north America, and the capital of Guadalajara, or New Galicia: weſt long. 108°, and north lat. 20° 45′.

GUADALAVIAR, a river of Spain, which riſes in the province of Arragon, and runs ſouth-eaſt through the province of Valencia, falling into the Mediterranean a little below the city of Valencia.

GUADALAXARA, a city of Spain, in the province of New Caſtile, twenty-eight miles north-weſt of Madrid: weſt long. 3° 50′, and north lat. 40° 40′.

GUADALUPE, one of the largeſt of the Caribbee-iſlands, eighty miles north of Martinico, ſubject to France: weſt long. 61°, and north lat. 16° 30′.

GUADARAMA, a town of New Caſtile, in Spain, twenty-three miles north-weſt of Madrid: weſt long. 4° 45′, and north lat. 40° 45′.

GUADIANA, a river of Spain, which riſes in the middle of New Caſtile, and running through Eſtremadura, enters Portugal; where paſſing through the provinces of Alentejo and Algarva, it diſcharges itſelf into the Atlantic ocean.

GUADILBARBAR, a river of Africa, which riſes in the mountains of Atlas, runs through the kingdom of Tunis, and falls into the Mediterranean ſea near Bona.

GUADILQUIVIR, a river of Spain, which riſes in the mountains of Segura, in New Caſtile, runs the whole length of Andaluſia, and paſſing by Cordova and Seville, falls into the Atlantic ocean at St. Lucar.

GUADIX, a city of Spain, in the province of Granada: weſt long. 3°, and north lat. 37° 15′.

GUAJACUM, or GUAIACUM, in botany, a genus of the decandria-monogynia claſs of plants, the flower of which conſiſts of five ovato-oblong patent petals, whereof the ſuperior ones are leaſt; the fruit is a roundiſh obliquely acuminated drupe, furrowed on one ſide; and the ſeeds are oval nuts, covered with pulp. The wood of guaiacum is extremely hard and ſolid, of a denſe, compact texture, and remarkably heavy; it conſiſts of two parts, a central matter, or heart, and an exterior one, or blea: the central part is extremely hard and ponderous, and is of a greeniſh colour, or elſe it is variegated with a pale or whitiſh colour, a duſky green, and a browniſh with the black the external part is of the colour of box-wood; but when we ſee the fragments of the branches of the tree entire, it is covered with a thin ſtrong bark. The wood is of a fragrant ſmell, and of an aromatic and pungent, but ſomewhat bitteriſh taſte.

Guaiacum is attenuant and apperient: it promotes the diſcharges by ſweat and urine, and ſtrengthens the ſtomach and the other viſcera. It is an excellent medicine in obſtructions of the liver and ſpleen, in the jaundice, dropſy, and many other chronic caſes, and gives relief in the rheumatiſm, and even in the gout.

The bark is a more powerful attenuant than the wood, but it is leſs proper for people of a feveriſh diſpoſition. Neither of them are given much in ſubſtance, the uſual way being in decoction with ſaſſafras, and other medicines of the ſame intention.

Beſides the wood and the bark, we have a reſin of it, under the improper name of gum-guaiacum. This is a ſolid but very friable ſubſtance, much reſembling common reſin, except in colour, it being of a duſky greeniſh hue, and ſometimes, though leſs frequently of a reddiſh colour. It is very acrid and pungent to the taſte, and when burnt, ſmells like guaiacum wood. It is given in the ſame caſes with the wood, and the famous balſamum polycreſtum is made of it.

GUALEOR, a city of the hither India, and the capital of the province of Gualeor, ſituated forty miles ſouth of Agra: eaſt long. 79°, and north lat. 26°.

GUAM, the chief of the Ladrone-iſlands, in the Pacific ocean: eaſt long. 140°, and north lat. 14°.

GUAN, or QUAN, an american bird, a little bigger than the common hen. In ſhape it ſomewhat reſembles a turkey, to which Mr. Edwards takes it to be near of kin. The top of the head is covered with black feathers, which it can erect into a creſt: the upper part of the body is of a dark colour, and the neck, breaſt, and belly are of the ſame colour, only ſpotted with white. See plate CX. fig. 3.

GUANIHANI, or ST. SALVADOR, now called Catt-iſland, one of the Bahama-iſlands in the Atlantic ocean, in north America: weſt longitude 76°, north latitude 24°.

GUANUCO, a town of Peru, in ſouth America,

America, one hundred and eighty miles north-east of Lima: west long. 75° 15', and south lat. 10°.

GUARANTY, in matters of polity, the engagement of mediatorial or neutral states, whereby they plight their faith, that certain treaties shall be inviolably observed, or that they will make war against the aggressor.

GUARANTY, or WARRANTY, in law. See the article WARRANTY.

GUARD, in a general sense, signifies the defence or preservation of any thing; the act of observing what passes, in order to prevent surprize; or the care, precaution, and attention we make use of, to prevent any thing happening contrary to our intention or inclinations.

GUARD, in the military art, is a duty performed by a body of men, to secure an army or place from being surprized by an enemy.

In a garrison the guards are relieved every day, and it comes to every soldier's turn once in three days, so that they have two nights in bed, and one upon guard. To be upon guard, to mount the guard, to dismount the guard, to relieve the guard, to change the guard, the officer of the guard, or the serjeant of the guard, are words often used, and well understood.

Advanced GUARD, is a party of either horse or foot, that marches before a more considerable body, to give notice of any approaching danger.

When an army is upon the march, the grand-guards which should mount that day, serve as an advanced-guard to the army: in small parties, six or eight horse are sufficient, and these are not to go above four or five hundred yards before the party.

An advanced guard is also a small body of twelve or sixteen horse, under a corporal, or quarter-master, posted before the grand-guard of a camp.

Artillery-GUARD, is a detachment from the army, to secure the artillery: their corps de garde is in the front, and their centries round the park. This is a forty-eight hours guard: and upon a march, they go in the front and rear of the artillery, and must be sure to leave nothing behind; if a gun or waggon break down, the captain is to leave a part of his guard to assist the gunners and matrosses in getting it up again.

Corps de GARDE, are soldiers entrusted with the guard of a post, under the command of one or more officers.

Counter-GUARD, in fortification. See the article COUNTER-GUARD.

Forrage-GUARD, a detachment sent out to secure the forragers, which are posted at all places, where either the enemy's party may come to disturb the forragers; or where they may be spread too near the enemy, so as to be in danger of being taken. They consist both of horse and foot, and must stay at their posts till the forragers all come off the ground.

Grand-GUARD, three or four squadrons of horse, commanded by a field officer, posted at about a mile and a half from the camp, on the right and left wings, towards the enemy, for the security of the camp.

Main-GUARD, that from whence all the other guards are detached.

Those who are to mount the guard, meet at their respective captain's quarters, and go from thence to the parade; where, after the whole guard is drawn up, the small guards are detached for the posts and magazines; and then the subaltern officers throw lots for their guards, and are commanded by the captain of the main-guard.

Piquet-GUARD, a good number of horse and foot always in readiness in case of an alarm: the horse are all the time saddled, and the riders booted. The foot draw up at the head of the battalion, at the beating of the tattoo; but afterwards return to their tents, where they hold themselves in readiness to march, upon any sudden alarm. This guard is to make resistance, in case of an attack, till the army can get ready.

Quarter-GUARD, a small guard, commanded by a subaltern officer, posted by each battalion, about an hundred yards before the front of the regiment.

Rear-GUARD, that part of the army which brings up the rear, which is generally the old grand-guards of the camp. The rear-guard of a party is six or eight horse, that march about four or five hundred paces behind the party. The advanced-guard of a party on its going out, make the rear-guard on its return.

Standard-GUARD, a small guard, under a corporal, out of each regiment of horse, and placed on foot, in the front of each regiment.

Van-GUARD, that part of the army which marches in the front.

GUARD is more particularly understood of a soldier

a soldier detached from a company or corps, to protect, detain, or secure any person, &c.

GUARDS are also troops kept to guard the king's person, called also royal-guards, life-guards, gardes du corps, &c. These are distinguished into horse, foot, grenadiers, and yeomen.

The english horse-guards are distinguished by troops, and the foot-guards by regiments.

Yeomen of the GUARD. See the article YEOMEN.

The french GUARDS are divided into those within, and those without the palace; the first consists of the gardes du corps, or body-guard, which consists of four companies of horse, the first of which companies was antiently Scotch, and still retains the name, though it now consists wholly of Frenchmen. The guards without, are the gens d'armes, light-horse, musqueteers, and two other regiments, the one of which is French and the other Swiss. See GENDARMES.

GUARD, in fencing, is a posture proper to defend the body from an enemy's sword.

There are four general guards of the sword; to form a perfect idea of which, we must suppose a circle drawn on a wall, and divided into four cardinal points, *viz.* top and bottom, right and left. When the point of the sword is directed to the bottom of the circle, with the hilt opposite to its top, the body inclining very forward, this is called the prime or first guard. The second guard, by many improperly called the tierce, is when the point is directed to the right or second point of the same circle, with the hilt of the sword turned to the left, and the body proportionably raised. The tierce, or third guard, is when the point of the sword is raised to the uppermost part of the same circle; in which case the body, the arm, and the sword, are in their natural position, and in the mean of the extremes of their motion. The quart, or fourth guard, is when the point of the sword is directed to the fourth point of the circle, descending to the right as far as one fourth of the tierce, with the outward part of the arm and the flat of the sword turned towards to the ground, and the body out of the line to the right, and the hilt of the sword towards the line to the left. There is also a quint, or fifth guard, which is only the return of the point of the sword to the right, after traversing the circle to the point of the prime, from whence it had departed, with a different disposition of the body, arm, and sword. The common center of all those motions ought to be in the shoulder.

In all these kinds of guards, there are the high-advanced, high-retired, and high-intermediate guard, when disposed before the upper part of the body, either with the arm quite extended, quite withdrawn, or in a mean state. The mean-advanced guard, or simply mean guard, is when the sword is placed before the middle part of the body. The low-advanced, retired or intermediate guards, are those where the arm and sword are advanced, withdrawn, or between the two extremes, before the lower part of the body.

GUARDANT, or GARDANT, in heraldry. See the article GARDANT.

GUARDIAN, in law, a person who has the charge of any thing; but more commonly it signifies one who has the custody and education of such persons as have not sufficient discretion to take care of themselves and their own affairs, as children and ideots.

There are several sorts of these guardians at common law, *viz.* guardians by nature, who are the father and mother; guardians in socage, being the next of blood; and guardians by reason of nurture, which is when the father by will appoints a person to be the guardian of his child. The statute ordains, that a father, by deed in his life-time, or by his will, may dispose of the custody of his child, under twenty-one years of age and not married, during the child's minority, to any persons who are not popish recusants, as he shall think fit; which guardians may bring actions of trespass, &c. against any unlawful takers away of such child or children, and take possession of their lands, &c. If the father appoints no guardians to his child, the ordinary, or spiritual court have power to order one for the goods and personal estate only, until the infant is of the age of fourteen; but as to his lands, there shall be a guardian in socage, &c. This guardianship in socage continues till the minor is fourteen years of age, at which time he may chuse his guardian before a judge, at his chambers, or in court, or chancery: likewise after the infant comes to that age, he may sue his guardian in socage, to account as bailiff.

The business of guardians is to take the profits of the minor's lands to his use, and

and to account for the ſame: they ought to ſell all moveables within a reaſonable time, and to convert them into land or money, except the minor is near of age, and may want ſuch things himſelf; and they are to pay intereſt for the money in their hands, that might have been ſo placed out; in which caſe it will be preſumed that the guardians made uſe of it themſelves. They are to ſuſtain the land of the heir, without making deſtruction of any thing thereon, and to keep it ſafely for him: if they commit waſte on the lands, it is a forfeiture of the guardianſhip. 3 Edw. I. And where perſons as guardians, hold over any land, without the conſent of the perſon who is next intitled, they ſhall be adjudged treſpaſſers, and ſhall be accountable. 6 Annæ, cap. xviii.

GUARDIANS D'EGLISE, are churchwardens or officers choſen in every pariſh, to have the care and cuſtody of the goods of the church.

GUARDIANS *of the peace*, are thoſe who have the keeping of the peace.

GUARDIAN, or WARDEN *of the cinque-ports*, is an officer who has the juriſdiction of the cinqueports, with all the power which the admiral of England has in other places.

GUARDIAN *of the ſpiritualities*, the perſon to whom the ſpiritual juriſdiction of any dioceſe is committed, during the time the ſee is vacant.

A guardian of the ſpiritualities may likewiſe be either ſuch in law, as the archbiſhop is of any dioceſe within his province; or by delegation, as he whom the archbiſhop, or vicar-general of the time, appoints. Any ſuch guardian has power to hold courts, grant licences, diſpenſations, probates of wills, *&c.*

GUBEN, a town of Germany, in the circle of Upper Saxony: eaſt long. 15°, and north lat. 51° 50′.

GUDGEON, *gobius*, in ichthyology. See the article GOBIUS.

GUDGEONS, in a ſhip, are the eyes drove into the ſtern-poſt, into which the pintles of the rudder go, to hang it. See plate CXXI. fig. 3.

The ſtems of the gudgeons are barbed, to prevent their being drawn out.

GUELPHS and GIBELINS. See the article GIBELINS.

GUENGA, a great river of the hither India, which riſing in the mountains of Balagate, runs north-eaſt, and falls into the weſt branch of the river Ganges, in Bengal.

GUERET, a town of France, in the province of Lionois: eaſt long. 2°, and north lat. 46° 5′.

GUERITE, a ſmall tower of wood or ſtone, generally placed on the point of a baſtion, or on the angles of the ſhoulder, to hold a centinel, who is to take care of the foſs, and to watch, in order to prevent a ſurprize.

GUERNSEY, or GARNSEY, an iſland in the engliſh channel, on the coaſt of Normandy, fifty-eight miles ſouth of Portland, in Dorſetſhire, and twenty-two weſt of cape la Hogue, in Normandy; about ten miles long and as many broad, containing ten pariſhes. The natives, who ſpeak French, are ſtill governed by the norman laws, but are ſubject to England.

GUETTARDA, in botany, a genus of the monoecia heptandria claſs of plants, the male and female flowers of which are monopetalous and funnel-ſhaped; the fruit is a dry, roundiſh, depreſſed drupe, containing a ſingle ſeed.

GUIAQUIL, a city and port-town of Peru, ſituated near the Pacific ocean: weſt long. 80°, and ſouth lat. 3°.

GUIARA, a port-town on the Caracoa-coaſt, in terra firma, in South America: weſt long. 66°, and north lat. 10° 35′.

GUIDON, a ſort of flag or ſtandard, borne by the king's life-guards; being broad at one extreme, and almoſt pointed at the other, and ſlit or divided into two.

GUIDON alſo denotes the officer who bears the guidon. He is the ſame in the horſe-guards that the enſign is in the foot. The guidon of a troop of horſe takes place next below a cornet.

GUIENNE, a province of France, bounded by the Orleanois on the north, by Gaſcony, from which it is ſeparated by the river Garonne, on the ſouth, by Languedoc on the eaſt, and by the bay of Biſcay on the weſt.

GUILANDINA, BONDUCH, in botany, a genus of the decandria-monagynia claſs of plants, the flower of which conſiſts of five lanceolate and ſeſſile petals: the fruit is a rhomboidal pod, containing only one cell, in which are included numerous oſſeous ſeeds, of a globoſo-compreſſed figure. The ſeeds of this plant, which are called Molucca nuts, are ſaid to be good in hernioſe tumours, and in the cholic; and to create an appetite and to promote the menſes.

GUILD, or GILD, a fraternity or company. As to the original of these guilds or companies, it was a law among the Saxons that every freeman of fourteen years of age, should find sureties to keep the peace, or be committed; upon which the neighbours entered into an association, and became bound for each other, either to produce him who committed any offence, or to make satisfaction to the injured party; in order to which they raised a sum among themselves, which they put into a common stock; out of which they upon occasion, made a pecuniary compensation according to the quality of the offence committed. These guilds are now companies, joined together with laws and orders made by themselves, by the licence of the prince.

GUILD, GILD, or GELD, is also used among our antient writers for a compensation, or mulct, for a fault committed.

GUILD-HALL, the chief hall of the city of London, for holding of courts, and for the meeting of the lord-mayor and commonalty, in order to make laws and ordinances for the welfare and regulation of the city.

GUILD-RENTS, are rents paid to the crown by any guild or fraternity: or those that formerly belonged to religious houses, and came to the crown at the general dissolution of monasteries.

GUILDFORD, or GULDEFORD, a borough-town of Surry, situated on the river Wye, thirty miles south-west of London.

It sends two members to parliament.

GUILLESTRE, a city of France, in the province of Dauphiny: east long 6° 20′, and north lat. 44° 45′.

GUINEA, a large country of Africa, situated between 15° east and 15° west longitude, and between 4° and 10° north latitude.

The British, Dutch, French; and other nations, have forts and factories on this coast.

GUINEA is also the name of a British gold-coin. See the article COIN.

GUINEA PIG, in zoology, a quadruped of the mouse or rat-kind, with a variegated body, resembling, in some measure, a young pig, whence the name. It is considerably larger than the rat, but less than the rabbit. See plate CXXI. fig. 5.

GUINEA-WORM, *dracunculus*, in zoology and medicine. See the article DRACUNCULI.

GUIPUSCOA, the north-east division of the province of Biscay, in Spain, situated on the confines of Navarre in France.

GUISE, a town of France, in the province of Picardy, situated on the river Oyse: east long. 3° 36′. and north lat. 49° 55′.

GUITAR, or GUITARRA, a musical instrument of the string-kind, with five double rows of strings, of which those that are bass, are in the middle, unless it be for the burden, an octave lower than the fourth.

This instrument was first used in Spain, and by the Italians. It has the particular denomination of spagnuola given it; and is found in Italy and other countries, but more frequently in Spain.

GULA, in anatomy, the same with the oesophagus. See OESOPHAGUS.

GULA, or GOLA, in architecture, a wavy member the contour of which resembles the letter S, which the Greeks call cymatium, and our architects an ogee. See the article CYMATIUM and OGEE.

This member is of two kinds, recta and inversa. The first and principal has its cavities or hollows above, and convexities below. This always makes the top of the corona of the corniche, jetting over the drip of the corniche, like a wave ready to fall. It is sometimes absolutely the entablature, as being the first or uppermost member of it.

The second, being also called gula inversa, as the first is called gula recta, is exactly the reverse of the former, the cavity or hollowness of it being at the bottom, so that with respect to the former it appears inverted. This is used in the architrave, and sometimes in the corniche along with the former, only separated by a reglet.

GULES, in heraldry, signifies the colour red, which is expressed in engraving by perpendicular lines falling from the top of the escutcheon to the bottom. See plate CXXI. fig. 6.

It is the first of all colours in armory, and was formerly prohibited to be worn by any person in his coat-armour, unless he were a prince, or had a permission from him. This colour is a symbol of charity, valour, and generosity, and represents blood-colour, and true scarlet.

The Romans, according to Spelman, painted the bodies of their gods, and generals that triumphed, with vermilion; and under the consuls, their soldiers were clad in red, hence called russati. And we are told that the Lacedemonians wore scarlet, to prevent seeing the blood issue from their wounds. Those who bear this colour, are obliged to relieve such as

Fig. 1. GRAPNELS.

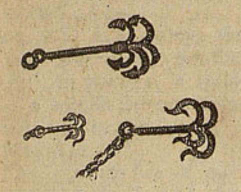


Fig. 2. GRUBBING-HOOK.

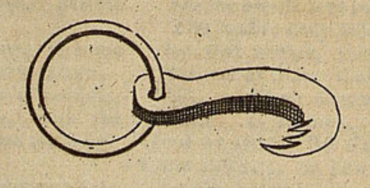


Fig. 4. GRYLLOTALPA



Fig. 3. GUDGEON.



Fig. 5. GUINEA-PIG.



Fig. 6. GULES.

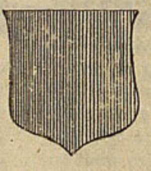
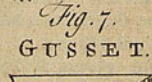


Fig. 7. GUSSET.



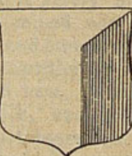
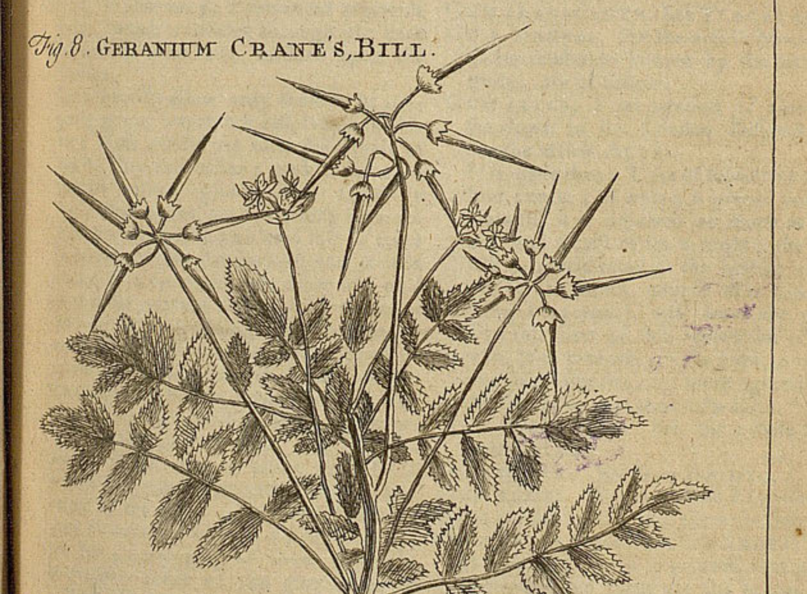


Fig. 8. GERANIUM CRANE'S BILL.



T. Jefferys sculp


BIBLIOTECA UNIVERSITARIA SEVILLA

are in danger of being oppreſſed by injuſtice.

GULL, the engliſh name of a genus of birds, called by authors larus. See the article LARUS.

GULLET, in anatomy, the engliſh name of the œſophagus. See OESOPHAGUS.

GULO, in zoology, a ſpecies of muſtela, of a reddiſh brown colour, with the middle of the back black. See the article MUSTELA.

This is of the ſize of our common cat; the head is ſmall, and of a kind of oval figure, ſlender at the ſnout, and rounded at the crown; the eyes are prominent, though not very large; the iris is of a deep hazel; the ears are ſhort and patulous; the noſtrils are large; the mouth is wide, and well furniſhed with teeth.

GULPH, or GULF, in geography, a part of the ſea, almoſt ſurrounded by land, as the gulph of Mexico, gulph of Venice, of Lyons, *&c.*

A gulph is ſtrictly diſtinguiſhed from a ſea, in that the latter is larger. See the article SEA.

It differs from a bay, in being greater than it. See the article BAY.

Some will have it eſſential to a gulph, to run into the land through a ſtreight or narrow paſſage. It is obſerved that the ſea is always moſt dangerous near gulphs, by reaſon of the currents being penned up by the ſhores.

GUM, in pharmacy, a concreted vegetable juice, which tranſudes through the bark of certain trees, and hardens upon the ſurface.

The chemiſts allow only thoſe to be properly gums, which are diſſolvable in water; thoſe which are only diſſolvable in ſpirits, they call reſins; and thoſe of a middle nature, gum reſins. Geoffroy ſays, that gums are ſomething between acid and oil; being an acid ſalt ſo fixed in earth, as that the greateſt part of it is changed to an alkali, the other into oil; ſo that the mixture ariſing from thence is an oily ſalt reſembling the ſaponaceous concretes of the chemiſts, made of oil of olives, and a lixivium of tartar; or the mucilaginous bodies formed of ſpirit of wine, and the volatile ſpirit of urine. The bodies of this claſs, Dr. Hill obſerves, if we were to allow all to be ſo which are generally received as ſuch, and called by the name gum, would appear very numerous: but, on a ſtrict enquiry, the far greater part of them appear to be properly either of the gum-reſin, or of the abſolute reſin-claſs, when all that are thus improperly called gums are ſeparated and placed in their proper claſſes. See the article RESIN.

The bodies truly belonging to this, are, by that author, reduced to ſo ſmall a number as four; theſe are, 1. Gum arabic. 2. Gum ſeneca. 3. Gum tragacanth. 4. Manna.

GUM ARABIC. See *Gum* ARABIC.

GUM SENECA, or SENEGA, as it is commonly written, is a gum extremely reſembling gum arabic. It is brought to us from the country through which the river Senega runs, in looſe or ſingle drops, but theſe are much larger than thoſe of the gum arabic uſually are; ſometimes it is of the bigneſs of an egg, and ſometimes much larger: the ſurface is very rough, or wrinkled, and appears much leſs bright than the inner ſubſtance, where the maſſes are broken. It has no ſmell, and ſcarce any taſte. We are not acquainted with the tree which produces it. The virtues of it are the ſame with the gum arabic; but is rarely uſed in medicine, unleſs as mixed with the gum arabic: the dyers and other artificers conſume the great quantities of it that are annually imported here. The negroes diſſolve it in milk, and in that ſtate make it a principal ingredient in many of their diſhes; and often feed on it thus alone.

GUM TRAGACANTH. See TRAGACANTH.

GUM MANNA. See the article MANNA.

Other ſubſtances known by the name of gums, are as follow.

GUM ALOES, a preparation of aloes, as ſet down in the London Diſpenſatory. See the article ALOE.

It is made thus: Take of ſuccotrine aloes, four ounces; of water, a quart: boil the aloes till it is diſſolved as much as may be; and ſet all by for a night: the reſin will be precipitated to the bottom of the veſſel; the liquor, poured off or ſtrained, being evaporated, will leave the gum. The intention of this ſeparation of the reſin, is to procure, in the gum, a medicine leſs purgative, but more agreeable to the ſtomach, than the crude aloes.

GUM AMMONIAC. See the article *Gum* AMMONIAC.

GUM ANIME. See *Gum* ANIME.

GUM ELEMI. See the article ELEMI.

GUM GUAIACUM. See GUAIACUM.

GUM LACCA. See the article LACCA.

It may be obſerved in general, that gums and inſpiſſated juices are the better, the

freer

freer they are from mixture and drofs; but that they are feldom fit for ufe before ftraining.

GUM, among gardeners, a kind of gangrene incident to fruit trees of the ftone-kind, arifing from a corruption of the fap, which, by its vifcidity, not being able to make its way through the fibres of the tree, is, by the protrufion of other juice, made to extravafate and ouze out upon the bark.

When the diftemper furrounds the branch, it admits of no remedy, but when only on one part of a bough, it fhould be taken off to the quick, and fome cow-dung clapped on the wound, covered over with a linen-cloth, and tied down. M. Quintinie directs to cut off the morbid branch two or three inches below the part affected.

GUM BOILS *Parulides*. See PARULIDES.

GUMS, *gingivæ*, in anatomy. See the article GINGIVÆ.

GUN, a fire-arm, or weapon of offence, which forcibly difcharges a ball, fhot, or other offenfive matter, through a cylindrical barrel, by means of gun-powder. See the article GUN-POWDER.

Gun is a general name, under which are included divers or even moft fpecies of fire-arms. They may be divided into great and fmall.

Great guns, called alfo by the general name cannons, make what we alfo call ordnance, or artillery; under which come the feveral forts of cannons, as cannon-royal, demi-cannon, &c. Culverins, demi-culverins, fakers, minions, falcons, &c. See CANNON, CULVERIN, &c. as alfo ORDNANCE and ARTILLERY.

Small guns include mufquets, mufquetoons, carabines, blunderbuffes, fowling-pieces, &c. See MUSQUET, &c.

Piftols and mortars are almoft the only fort of regular weapons, charged with gun-powder, that are excepted from the denomination of guns. See the articles PISTOL and MORTAR.

We have given the proportions and ufes of thefe fire-arms, under their refpective articles; but that their parts may be the more diftinctly comprehended, there is delineated in the plate of gunnery (CXXII.) fig. 1. a view of the outfide of a piece of ordnance, with the names of its parts; fig. 2. *ibid.* fhews the chafe or bore, and the thicknefs of the metal; fig. 4. is a cannon mounted on its carriage; and fig. 3. is a mortar mounted on its carriage.

The advantage of large guns, or cannons, over thofe of a fmaller bore, is generally acknowledged. Robins obferves that this advantage arifes from feveral circumftances, particularly in diftant cannonading. The diftance to which larger bullets fly with the fame proportion of powder, exceeds the flight of the fmaller ones, almoft in proportion to their diameters; fo that a thirty-two pound fhot, for inftance, being fomewhat more than fix inches in diameter, and a nine-pound fhot but four inches, the thirty-two pound fhot will fly near half as far again as that of nine pound, if both pieces are fo elevated as to range to the fartheft diftance poffible. Another and more important advantage of heavy bullets is, that with the fame velocity they break holes in all folid bodies, in a greater proportion than their weight. Finally, large cannons, by carrying the weight of their bullet in grape or lead-fhot, may annoy the enemy more effectually than could be done by ten times the number of fmall pieces. See the article GUNNERY.

The author here quoted, has propofed to change the fabric of all the pieces employed in the britifh navy, from the twenty-four pounders downwards, fo that they may have the fame or lefs weight, but a larger bore. He thinks the thirty-two pounders in prefent ufe would be proper models for this purpofe. Thefe being of fifty-two or fifty three hundred weight, have fomewhat lefs than a hundred and two thirds for each pound of bullet. And that this proportion would anfwer in fmaller pieces, in point of ftrength, feems clear from thefe confiderations: 1. That the ftrength of iron, or any other metal, is in proportion to its fubftance. 2. That the leffer quantity of powder fired in a fpace it fills, has proportionably lefs force than a larger quantity; fo that if two pieces, a large and a fmall one, be made in the fame proportion to their refpective bullets, and fired with a proportionable quantity of powder, the larger piece will be more ftrained, will heat more, and recoil more than the fmaller.

On this fcheme our prefent twenty-four pounders will be eafed of fix or eight hundred weight of ufelefs metal; and fome pieces of a lefs calibre, as nine and fix pounders, would be fometimes eafed by fourteen hundred; hence much larger guns, of the fame weight, might be borne. Thus, inftead of fix, nine, twelve, and eighteen pounders, our fhips might carry twelve, eighteen, and twenty-four

pounders;

pounders: guns would be kept cooler and quieter, and would be of more ſervice, in many reſpects, if their uſual charge of powder were diminiſhed.

Gun is alſo a name given to an inſtrument uſed by miners in cleaving rocks with gun-powder. It is an iron cylinder of an inch and a half thick, and about ſix inches long; and having a flat ſide to receive the ſide of a wedge; and a hole drilled through it to communicate with the inſide of the hole in the rock: this hole is made about eight inches deep, and in the bottom of it is put about two or three ounces of gun-powder: then this gun is driven forcibly in, ſo as to fill up the hole, and the wedge is driven in on its flat ſide to ſecure it.

The priming at the hole is then fired by a train, and the orifice being ſo well ſtopped by this gun, the force of the powder is determined to the circumadjacent parts of the rock, which it ſplits. See the article Mining.

Gun-room, in a ſhip, the apartment under the great cabin, where the maſter-gunner and his crew rendezvous, get ready their cartridges, &c. and do all things belonging to their buſineſs.

GUNDELIA, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants, the compound flower of which is tubulated and uniform, with the hermaphrodite corollulæ equal; the partial flower is monopetalous and clavated, with a ventricoſe, quinquifid, erect limb; there is no pericarpium; the ſeeds, which are ſolitary, roundiſh, acuminated, and coronated with an obſolete margin, are perfectly immerſed and hid in the receptacle: the common receptacle is conic, and covered every where with partial ones, divided with tricuſpidated paleæ; the partial receptacle is conico-obtuſe, quadrangular, and truncated.

GUNELLUS, in ichthyology, a ſpecies of blennius, called alſo the butter-fiſh, with about ten black ſpots beſide the back-fin.

GUNNER, an officer appointed for the ſervice of the cannon; or one ſkilled to fire the guns.

In the Tower of London, and other garriſons, as well as in the field, this officer carries a field ſtaff, and a large powder horn in a ſtring over his left ſhoulder: he marches by the guns, and when there is any apprehenſion of danger, his field ſtaff is armed with match: his buſineſs is to lay the gun to paſs, and to help to load and traverſe her.

Gunner of a ſhip, or maſter gunner, has the charge of all the ordnance the ſhip carries, to ſee that they be ſerviceably mounted, and ſufficiently ſupplied with ſpunges, ladles, and rammers; that in foul weather they be traverſed within board, eſpecially thoſe of the lower tire, and that the parts be ſhut, and caulked up; and that at all times they may be well laſhed, and made faſt, leſt any of them break looſe, to the imminent danger of foundering the ſhip. In the time of an engagement, the gunner is to ſee that every piece be ſufficiently manned: he is anſwerable to give an account of all his charge upon demand. He has a mate and quarter-gunners for his aſſiſtance.

Maſter Gunner, a patent-officer of the ordnance, who is appointed to teach all ſuch as learn the art of gunnery, and to certify to the maſter-general the ability of any perſon recommended to be one of the king's gunners. To every ſcholar he adminiſters an oath, not to ſerve, without leave, any other prince or ſtate; or teach any one the art of gunnery, but ſuch as have taken the ſaid oath.

Gunner's level. See the article Level.

GUNNERY, is the art of determining the courſe and directing the motion of bodies ſhot from artillery, or other warlike engines.

The great importance of this art is the reaſon it is diſtinguiſhed from the doctrine of projectiles in general: for it is no more than an application of thoſe laws which all bodies obſerve when caſt into the air, to ſuch as are put in motion by the exploſion of guns or other engines of that ſort. And it is the ſame thing whether it is treated in the manner of projectiles in general, or of ſuch only as belong to gunnery; for from the moment the force is impreſſed, all diſtinction with regard to the power which put the body firſt in motion is loſt, and it can only be conſidered as a ſimple projectile. See the article Projectiles.

Prob. I. The impetus of a ball, and the horizontal diſtance of an object aimed at, with its perpendicular height or depreſſion, if thrown on aſcents or deſcents, being given, to determine the direction of that ball.

From the point of projection A (plate CXXII. fig. 5, 6, 7, 8) draw A m repreſenting the horizontal diſtance, and B m the perpendicular height of the object aimed at: Biſect A m in H, and

A H in f; on H and f erect H T, fF perpendicular to the horizon, and biſecting A B the oblique diſtance or inclined plane in D, and A D in F. On A raiſe the impetus A M at right angles with the horizon, and biſect it perpendicularly in c, with the line G G. Let the line A C be normal to the plane of projection A B, and cutting G G in C; from C as center, with the radius C A, deſcribe the circle A G M cutting if poſſible the line F S in S, s, points equally diſtant from G; lines drawn from A through S, s will be the tangents or directions required.

Continue A S, A s to T, t; biſſect D T, D t, in V, v; and draw lines from M to S, s; then the $\angle$ A S F $=$ $\angle$ M A S $=$ $\angle$ A M s $=$ $\angle$ s A F; and for the ſame reaſon $\angle$ A s F $=$ $\angle$ M A s $=$ $\angle$ A M S $=$ $\angle$ S A F; wherefore the triangles M A S, S A F, sAF are ſimilar, and A M : A s :: A s : sF $= tv$; conſequently A T is a tangent of the curve paſſing through the points A, v, and B; becauſe $tv = v$D, A D is an ordinate to the diameter T H, and where produced muſt meet the curve in B.

In horizontal caſes (fig. 7.) v is the higheſt point of the curve, becauſe the diameter T v H is perpendicular to the horizon.

When the mark can be hit with two directions (the triangles S A M, sA F being ſimilar) the angle which the loweſt direction makes with the plane of projection is equal to that which the higheſt makes with the perpendicular A M, or $\angle$ s A F $=$ $\angle$ SAM. And the angle SAs, comprehended between the lines of direction, is equal to the angle S C G, and is meaſured by the arch S G.

When the points S, s coincide with G, or when the directions A S, A s become A G; (fig. 8.) A B will the greateſt diſtance that can be reached with the ſame impetus on that plane; becauſe S F coinciding with G g the tangent of the circle at G, will cut off A g a fourth part of the greateſt amplitude on the plane A B. The rectangular triangles m A B, c A C are ſimilar, becauſe the angle of obliquity mA B $= c$ A C; wherefore m A : m B :: $\frac{1}{2}$ impetus : c C, and m A : A B :: Ac : A C.

Horizontal projections (ibid. fig. 7, 8.) When the impetus is greater than half the amplitude, there are two directions, T A H, and t A H for that amplitude; when equal to it, only one; and when leſs, none at all; and converſely. For in the firſt caſe the line F S cuts the circle in two points S, s, in the ſecond caſe it only touches it, and in the laſt it meets not with it at all; and converſely. When there is but one direction for the amplitude A m, the angle of elevation is 45°; and when the angle of elevation is of 45° A m is the greateſt amplitude for that impetus, and equal to twice the impetus. The impetus remaining the ſame, the amplitudes are in proportion to one another as the ſigns of double the angles of elevation, and converſely. For drawing s N (fig. 7.) parallel and equal to A F a fourth part of the amplitude, and ſuppoſing lines drawn from s to the points C and M, the angle A C s $=$ 2 A M s $=$ 2 s A F; therefore N s, the ſine of A C s, is the ſine of twice the angle s A F; half the impetus being radius.

Whence, at the directions of 15° or 75°, the amplitude is equal to the impetus; for from what has been ſaid, half the impetus being radius, a fourth part of the amplitude is the ſine of twice the angle of elevation; but the ſine of twice 15°, that is, the ſine of 30° is always equal to half the radius; or in this caſe a fourth part of the impetus is equal to a fourth part of the amplitude. From this and the preceding prop. there are two eaſy practical methods for finding the impetus of any piece of ordnance. The fourth part of the amplitude is a mean proportional between the impetus at the curve's principal vertex and its altitude. For M N : N s :: N s : N A $=$ sF $=$ vD.

The altitudes are as the verſed ſines of double the angles of elevation, the impetus remaining the ſame. For making half the impetus radius, A N the altitude is the verſed ſine of the angle A C s $=$ twice $\angle$ s A F. And alſo, radius : tangent $\angle$ elevation :: $\frac{1}{4}$ amplitude : altitude; that is, R : tangent $\angle$ s A f :: A f : fs $=$ D v.

Proj. on aſcents and deſcents, fig. 5, 6. If the mark can be hit only with one direction A G, the impetus in aſcents will be equal to the ſum of half the inclined plane and half the perpendicular height, and in deſcents it will be equal to their difference; but if the mark can be reached with two directions, the impetus will be greater than that ſum or difference. For when A G is the line of direction, the $\angle$ g G A being $=$ MAG $=$ G A g; G g $=$ A g, and g z added to or ſubſtracted from both makes G z half the

the impetus equal to the ſum or difference of Ag a fourth part of the inclined plane, and gz a fourth part of the perpendicular height. In any other direction F P is greater than $Fo = AF$; and Ff added to or ſubſtracted from both, makes fP half the impetus greater than the ſum or difference of A F a fourth part of the inclined plane, and Ff a fourth part of the perpendicular height. Whence if in aſcents the impetus be equal to the ſum of half the inclined plane and half the perpendicular height, or if in deſcents it be equal to their difference, the mark can be reached only with one direction; if the impetus is greater than that ſum or difference, it may be hit with two directions; and if the impetus is leſs, the mark can be hit with none at all.

Prob. II. The angles of elevation, the horizontal diſtance, and perpendicular height being given, to find the impetus. Fig. 5, 6.

From theſe data you have the angle of obliquity, and length of the inclined plane; then as

$As : AM :: S.\angle AMs : S.\angle AsM :: S.\angle sAF : S.\angle MAF$, and $AF : As :: S.\angle MAs : S.\angle MAF$; whence by the ratio of equality, $AF : AM :: S.\angle sAF \times S.\angle MAs : S.\angle MAF \times S.\angle MAF$, which gives this rule.

Add the log. of A F to twice the logarithmic ſine of the angle M A F; from their ſum ſubſtract the logarithmic ſines of the angles sAF and MAs, and the remainder will give the logarithim of A M the impetus.

When the impetus and angles of elevation are given, and the length of the inclined plane is required, this is the rule.

Add the log. of A M to the log. ſines of the angles sAF and MAs; from their ſum ſubſtract twice the log. ſine of $\angle MAF$, and the remainder will give the log. of A F the fourth part of the length of the inclined plane.

If the angle of elevation tAH and its amplitude A B (fig. 8.) and any other angle of elevation tAH is given; to find the amplitude Ab for that other angle, the impetus A M and angle of obliquity D A H remaining the ſame.

Deſcribe the circle A G M, take A F a fourth part of A B, and Af a fourth part of Ab: From the points F, f, draw the lines Fs and fp parallel to A M, and cutting the circle in the points s, p; then $AF : AM :: S.\angle sAF \times S.\angle MAs : S.\angle MAF \times S.\angle MAF$; and $AM : Af :: S.\angle MAF \times S.\angle MAF : S.\angle pAf \times S.\angle pAM$; whence by the ratio of equality,

$AF : Af :: S.\angle sAF \times S.\angle MAs : S.\angle pAf \times S.\angle pAM$, which gives this Rule.

Add the log. of A F to the log. ſines of the angles pAf, pAM; from their ſum ſubſtract the log. ſines of the angles sAF, sAM, and the remainder will give the log. of Af, a fourth part of the amplitude required.

Prob. III. To find the force or velocity of a ball or projectile at any point of the curve, having the perpendicular height of that point, and the impetus at the point of projection given. From theſe two data find out the impetus at that point; then 2 × 16 feet 1 inch is the velocity acquired by the deſcent of a body in a ſecond of time; the ſquare of which (4 × □ 16 feet 1 inch) is to the ſquare of the velocity required, as 16 feet 1 inch is to the impetus at the point given; wherefore multiplying that impetus by four times the ſquare of 16 feet 1 inch, and dividing the product by 16 feet 1 inch, the quotient will be the ſquare of the required velocity; whence this rule.

Multiply the impetus by four times 16 feet 1 inch, or 64 feet $\frac{1}{3}$, and the ſquare root of the product is the velocity.

Thus ſuppoſe the impetus at the point of projection to be 3000, and the perpendicular height of the other point 100; the impetus at that point will be 2900. Then 2900 feet multiplied by 64 $\frac{1}{3}$ feet gives 186566 feet, the ſquare of 432 nearly, the ſpace which a body would run thro' in one ſecond, if it moved uniformly.

And to determine the impetus or height, from which a body muſt deſcend, ſo as at the end of the deſcent it may acquire a given velocity, this is the rule:

Divide the ſquare of the given velocity (expreſſed in feet run through in a ſecond) by 64 $\frac{1}{3}$ feet, and the quotient will be the impetus.

The duration of a projection made perpendicularly upwards, is to that of a projection in any other direction whoſe impetus is the ſame, as the ſine complement of the inclination of the plane of projection (which in horizontal projections is radius) is to the ſine of the angle contained between the line of direction and that plane.

Draw out At (fig. 5.) till it meets mB

conti-

continued in E, the body will reach the mark B in the same time it would have moved uniformly through the line A E; but the time of its fall through M A the impetus, is to the time of its uniform motion thro' A E, as twice the impetus is to A E. And therefore the duration of the perpendicular projection being double the time of its fall, will be to the time of its uniform motion through A E; as four times the impetus is to A E; or as A E is to E B; that is, as A *t* is to *t* D; which is as the sine of the angle *t* D A (or M A B its complement to a semicircle) is the sine of the angle *t* A D.

Hence the time a projection will take to arrive at any point in the curve, may be found from the following data, *viz.* the impetus, the angle of direction, and the inclination of the plane of projection, which in this case is the angle the horizon makes with a line drawn from the point of projection to that point.

Hence also in horizontal cases, the durations of projections in different directions with the same impetus, are as the sines of the angles of elevation. But in ascents or descents their durations are as the sines of the angles which the lines of direction make with the inclined plane. Thus, suppose the impetus of any projection were 4500 feet; then 16 feet 1 inch : 1″ : : 4500 feet : 275″ the square of the time a body will take to fall perpendicularly thro' 4500 feet, the square root of which is 16″ nearly, and that doubled gives 32″ the duration of the projection made perpendicularly upwards. Then to find the duration of a horizontal projection at any elevation, as 20°; say R : S. ∟ 20° : : 32″ : Duration of a projection at that elevation with the impetus 4500. Or if with the same impetus a body at the direction of 35° was projected on a plane inclined to the horizon 17°, say as sine 73° : sine 18° : : 32″ : duration required.

The two following tables, at one view, give all the necessary cases as well for shooting at objects on the plane of the horizon, with proportions for their solutions, as for shooting on ascents and descents.

TABLE I. For Horizontal Projections. Fig. 7.

Cases.	Given.	Required.	Proportions.
1	AM, A*m*	*t* A H H*v*	2 A M : A *m* : : R : S. 2 ∟ *t* A H R : T. ∟ *t* A H : : $\frac{Am}{4}$: H*v*
2	A M, *t* A H	A *m*	R : S. 2 ∟ *t* A H : : 2 A M : A *m*.
3	A *m*, *t* A H	A M	S. 2 ∟ *t* A H : R : : $\frac{Am}{2}$: A M
4	A M, H*v*	A *m*	$\sqrt{AN \times NM} = \frac{Am}{4}$, or ½ Log. A N + ½ Log. N M = Log. ¼ A *m*.
5	A *m*, H*v*	*t* A H A M	$\frac{Am}{4}$: H*v* : : R : T. ∟ *t* A H. A N : $\frac{Am}{4}$: : $\frac{Am}{4}$: N M, and A N + N M = A M.
6	H*v*, *t* A H	A *m*	T. ∟ *t* A H : R : : H*v* : $\frac{Am}{4}$
7	*t* A H, A *m* and any other angle. any other amplitude.	any other amplitude belonging to that angle. any other angle belonging to that amplitude.	S. 2 ∟ *t* A H : S. 2 any other ∟ : : A *m* : amplitude required. A *m* : any other amplitude : : S. 2 ∟ *t* A H : S. 2 ∟ required.
8	*t* A H, H*v*, any other angle any other altitude.	any other altitude. any other angle.	V. S. 2 ∟ *t* A H : V. S. 2 any other ∟ : : H*v* : altitude required H*v* : any other altitude : : V. S. 2 ∟ *t* A H : V. S. 2 ∟ required.

TABLE

TABLE II. For Projections on Ascents and Descents. Fig. 5, 6.

Cases.	Given.	Required.	Proportions.
1	AM, A*m*, B*m*, AB.	TAH, *t*AH.	A*m* : B*m* : : R : T.∠BA*m*, half of which added to 45°, gives ∠GA*z*. AM:AB::A*c*:AC=CG. T.∠GA*z*:R::G*z*:A*z*, and A*z*—A*f*=*fz*=PG. CG:PG::R:V.S. of SG, half of which added to, or taken from GA*z*, gives the higher or lower direction required.
2	TAH, *t*AH, AF	AM	Log. of AM=Log. of AF+2 Log. S.∠MAF—Log. S.∠*s*AF—Log. S. ∠MA*s*.
3	TAH, *t*AH, AM	AF	Log. of AF=Log. AM+Log. S. ∠*s*AF+Log. S. ∠MA*s*—2 Log. S. ∠MAF.
4	BA*m*, *t*AH, AB, and any other angle *t*AH	A*b* the amplitude for that other angle.	Fig. 8. Log. A*f*= Log. AF+Log. S.∠*p*A*f*+Log.S.∠*p*AM—Log. S. ∠*s*AF—Log. S. ∠MA*s*.
5	AM, DAH	A*g*	Fig. 5, 6. T.∠GA*z*:Sec. ∠*g*A*z*::G*z*:A*g*.

GUN-POWDER, a composition of saltpetre, sulphur, and charcoal, mixed together, and usually granulated; which easily takes fire, and, when fired, rarifies, or expands, with great vehemence, by means of its elastic force.

It is to this powder we owe all the action and effect of guns, ordnance, *&c.* so that the modern military art, fortification, *&c.* in great measure depend thereon.

Method of making GUN-POWDER. Dr. Shaw's recipe for this purpose is as follows. Take four ounces of refined saltpetre, an ounce of brimstone, and six drams of small coal: reduce these to a fine powder, and continue beating them for some time in a stone mortar, with a wooden pestle, wetting the mixture between whiles with water, so as to form the whole into an uniform paste, which is reduced to grains, by passing it thro' a wire-sieve fit for the purpose; and in this form being carefully dried, it becomes the common gun powder.

For greater quantities, mills are usually provided, by means of which more work may be performed in one day, than a man can do in a hundred. See MILL.

The nitre or saltpetre is refined thus: dissolve four pounds of rough nitre as it comes to us from the Indies, by boiling it in as much water as will commodiously suffice for that purpose: then let it shoot for two or three days in a covered vessel of earth, with sticks laid across for the crystals to adhere to. These crystals being taken out, are drained and dried in the open air.

In order to reduce this salt to powder, they dissolve a large quantity of it in as small a proportion of water as possible; then keep it constantly stirring over the fire, till the water exhales, and a white, dry powder is left behind. See NITRE.

In order to purify the brimstone employed, they dissolve it with a very gentle heat; then scum and pass it through a double strainer. If the brimstone should happen to take fire in the melting, they have an iron cover that fits on close to the melting vessel, and damps the flame. The brimstone is judged to be sufficiently refined if it melts without yielding any fetid odour between two hot iron plates into a kind of red substance.

The coal for the making of gun-powder is either that of willow, or hazel, well charred in the usual manner, and reduced to powder. And thus the ingredients are prepared for making this commodity;

modity: but as theſe ingredients require to be intimately mixed, and as there would be danger of their firing if beat in a dry form, the method is to keep them continually moiſt, either with water, urine, or a ſolution of ſal armoniac: they continue thus ſtamping them together for twenty-four hours, after which the maſs is fit for corning and drying in the ſun, or otherwiſe, ſo as ſedulouſly to prevent its firing.

Rationale of GUN-POWDER. The exploſive force of gun-powder is now a thing commonly known, but the phyſical reaſon thereof may not perhaps be hitherto ſufficiently underſtood. In order to explain it, Dr. Shaw propoſes the following obſervations, 1. That ſalt petre of itſelf is not inflammable, and though it melts in the fire, and grows red-hot, yet does not explode, unleſs it comes in contact with the coals. 2. That brimſtone eaſily melts at the fire, and eaſily catches flame. 3. That powdered charcoal readily takes fire, even from the ſparks yielded by a flint and ſteel. 4. That if nitre be mixed with powdered charcoal, and brought in contact with the fire, it burns and flames. 5. That if ſulphur be mixed with powdered charcoal, and applied to the fire, part of the ſulphur burns ſlowly away, but not much of the charcoal; and, 6. That if a lighted coal be applied to a mixture of nitre and ſulphur, the ſulphur preſently takes fire with ſome degree of exploſion; leaving part of the nitre behind, as we ſee in making the ſal prunellæ, and ſal polychreſtum.

Theſe experiments duly conſidered, adds the doctor, may give us the chemical cauſe of the ſtrange exploſive force of gun-powder. For each grain of this powder conſiſting of a certain proportion of ſulphur, nitre, and coal, the coal preſently takes fire, upon contact of the ſmalleſt ſpark: at which time both the ſulphur and the nitre immediately melt, and by means of the coal interpoſed between them, burſt into flame; which, ſpreading from grain to grain, propagates the ſame effect almoſt inſtantaneouſly: whence the whole maſs of powder comes to be fired; and as nitre contains both a large proportion of air and water, which are now violently rarified by the heat, a kind of fiery exploſive blaſt is thus produced, wherein the nitre ſeems, by its aqueous and aerial parts, to act as bellows to the other inflammable bodies, ſulphur and coal, to blow them into a flame, and carry off their whole ſubſtance in ſmoke and vapour.

Different kinds of GUN-POWDER. The three ingredients of gun-powder are mixed in various proportions according as the powder is intended for muſquets, great guns or mortars; though theſe proportions ſeem not to be perfectly adjuſted, or ſettled by competent experience. Semienowitz for mortars, directs 100 ℔ of ſalt-petre, 25 ℔ of ſulphur, and as many of charcoal; for great guns, 100 ℔ ſalt-petre, 15 ℔ of ſulphur, and 18 ℔ of charcoal; for muſquets and piſtols 100 ℔ of ſalt-petre, 8 ℔ of ſulphur, and 10 lb. of charcoal. Miethius extols the proportion of 1 lb. of ſalt-petre to three ounces of charcoal, and two, or two and a quarter of ſulphur; than which, he affirms, no gun-powder can poſſibly be ſtronger. He adds, that the uſual practice of making the gun-powder weaker for mortars than guns, is without any foundation, and renders the expence needleſsly much greater: for whereas to load a large mortar, 24 lb. of common powder is required, and conſequently to load it ten times 240 lb. he ſhews by calculation, that the ſame effect would be had by 150 lb. of the ſtrong powder.

To increaſe the ſtrength of powder, Dr. Shaw thinks it proper to make the grains conſiderably large, and to have it well ſifted from the ſmall duſt. We ſee that gun-powder, reduced to duſt, has little exploſive force; but when the grains are large, the flame of one grain has a ready paſſage to another, ſo that the whole parcel may thus take fire nearly at the ſame time, otherwiſe much force may be loſt, or many of the grains go away as ſhot unfired.

It ſhould alſo ſeem that there are other ways of increaſing the ſtrength of powder, particularly by the mixture of ſalt of tartar; but perhaps, adds the laſt-mentioned author, it were improper to divulge any thing of this kind, as gun-powder ſeems already ſufficiently deſtructive.

Method of trying and examining GUN-POWDER. There are two general methods of examining gun-powder; one with regard to its purity, the other with regard to its ſtrength. Its purity is known by laying two or three little heaps near each other upon white paper, and firing one of them; for if this takes fire readily

readily, and the ſmoke riſes upright without leaving any droſs, or feculent matter behind, and without burning the paper, or firing the other heaps, it is eſteemed a ſign that the ſulphur and nitre were well purified, that the coal was good, and that the three ingredients were thoroughly incorporated together: but if the other heaps alſo take fire at the ſame time, 'tis preſumed that either common ſalt was mixed with the nitre, or that the coal was not well ground, or the whole maſs not well beat, and mixed together; and if either the nitre or ſulphur be not well purified, the paper will be black or ſpotted.

In order to try the ſtrength of gun-powder, there are two kinds of inſtruments in uſe; but neither of them appear more exact than the common method of trying to what diſtance a certain weight of powder will throw a ball from a muſquet.

There has been much talk of a white powder which, if it anſwered the character given it, might be a dangerous compoſition: for they pretend that this white powder will throw a ball as far as the black, yet without making a report; but none of the white powder we have ſeen, ſays Dr. Shaw, anſwers to this character; being, as we apprehend, commonly made either with touchwood or camphor, inſtead of coal.

Obſervations on the force of GUN-POWDER.

Gun-powder fired either in vacuum, or in air, produces by its exploſion a permanent elaſtic fluid. For if a red-hot iron be included in a receiver, after being exhauſted, and gun-powder be let fall on the iron, the powder will take fire, and the mercurial gage will ſuddenly deſcend upon the exploſion; and though it immediately aſcends again, yet it will never riſe to the height it firſt ſtood at, but will continue depreſſed by a ſpace proportioned to the quantity of gun-powder which was let fall on the iron.

The ſame production likewiſe takes place, when gun powder is fired in the air: for if a ſmall quantity of powder be placed in the upper part of a glaſs tube, and the lower part of the tube be immerged in water, and the water be made to riſe ſo near the top, that only a ſmall portion of air is left in that part where the gun-powder is placed; if in this ſituation the communication of the upper part of the tube with the external air be cloſed, and the powder be fired, which will eaſily be done by a burning-glaſs, the water will in this experiment deſcend upon the exploſion as the quickſilver did in the laſt; and will always continue depreſſed below the place at which it ſtood before the exploſion; and the quantity of this depreſſion will be greater, if the quantity of powder be increaſed, or the diameter of the tube be diminiſhed. From whence it is proved, that as well in air as in a vacuum, the exploſion of fired powder produces a permanent elaſtic fluid. It alſo appears from experiment, that the elaſticity or preſſure of the fluid produced by the firing of gun-powder, is, *cæteris paribus*, directly as its denſity. This follows from hence, that if in the ſame receiver a double quantity of powder be let fall, the mercury will ſubſide twice as much as in the firing of a ſingle quantity.

To determine the elaſticity and quantity of this elaſtic fluid, produced from the exploſion of a given quantity of gun-powder, Mr. Robins premiſes, that the elaſticity of this fluid increaſes by heat, and diminiſhes by cold in the ſame manner as that of the air; and that the denſity of this fluid, and conſequently its weight, is the ſame with the weight of an equal bulk of air having the ſame elaſticity, and the ſame temperature. From theſe principles, and from his experiments, for a detail of which we muſt refer the reader to his New Principles of Gunnery, in Scholium, to prop. II. he concludes, that the fluid produced by the firing of gun-powder will be $\frac{3}{10}$ of the weight of the gun-powder, and the ratio of the reſpective bulks of the powder, and the fluid produced from it, will be in round numbers 1 to 244.

Hence we are certain, that any quantity of powder fired in any confined ſpace, which it adequately fills, exerts, at the inſtant of its exploſion, againſt the ſides of the veſſel containing it, and the bodies it impels before it, a force at leaſt 244 times greater than the elaſticity of common air; or which is the ſame thing, than the preſſure of the atmoſphere; and this without conſidering the great addition which this force will receive from the violent degree of heat with which it is endued at that time, the quantity of which augmentation is the next head of Mr. Robins's enquiry. He determines that the elaſticity of the air is augmented when heated to the extremeſt heat of red hot iron, in the proportion of 796 to 194½, and ſuppoſing that the flame of fired

fired gun-powder is not lefs hot than red hot iron, and the elafticity of the air, and confequently of the fluid, generated by the explofion, being augmented by the extremity of this heat in the ratio of 796 to 194⅓, it follows that if 244 be augmented in this ratio, the refulting number which is 999⅓ will determine how many times the elafticity of the flame of fired powder exceeds the elafticity of common air, fuppofing it to be confined in the fame fpace, which the powder filled before it was fired.

Hence then the abfolute quantity of the preffure exerted by gun-powder, at the moment of its explofion may be affigned: for fince the fluid then generated has an elafticity of 999⅓, or in round numbers 1000 times greater than common air; and fince common air by its elafticity exerts a preffure on any given furface equal to the weight of the incumbent atmofphere, with which it is in equilibrio, the preffure exerted by fired powder, before it has dilated itfelf, is 1000 times greater than the preffure of the atmofphere; and confequently the quantity of this force on a furface of an inch fquare, amounts to above fix tun weight, which force however diminifhes as the fluid dilates itfelf. The variation of the denfity of the atmofphere does not any way alter the action of powder by any experiment that can be made. But the moifture of the air has a very great influence on the force of it; for that quantity which in a dry feafon would communicate to a bullet a velocity of 1700 feet in one fecond, will not in damp weather communicate a velocity of more than 12 or 1300 feet in a fecond, or even lefs, if the powder be bad and negligently kept.

The velocity of expanfion of the flame of gun-powder when fired in a piece of artillery, without either bullet, or any other body before it, is prodigious. By the experiments of Mr. Robins, it feems this velocity cannot be much lefs than 7000 feet in a fecond. This, however, muft be underftood of the moft active part of the flame. For as was obferved before, the elaftic fluid in which the activity of gun-powder confifts, is only $\frac{3}{10}$ of the fubftance of the powder, the remaining $\frac{7}{10}$ will in the explofion be mixed with the elaftic part, and will by its weight retard the activity of the explofion; and yet they will be fo compleatly united as to move with uncommon motion; but the unelaftic part will be lefs accelerated than the reft, and fome of it will not even be carried out of the barrel, as appears by the confiderable quantity of unctuous matter, which adheres to the infide of all fire-arms, after they have been ufed. Thefe inequalities in the expanfive motion of the flame render it impracticable to determine its velocity, otherwife than from experiments.

To recover damaged GUN-POWDER. The method of the powder-merchants is this; they put part of the powder on a failcloth, to which they add an equal weight of what is really good, and with a fhovel mingle it well together; dry it in the fun, and barrel it up, keeping it in a dry and proper place. Others again, if it be very bad, reftore it by moiftening it with vinegar, water, urine, or brandy: then they beat it fine, fearce it, and to every pound of powder add an ounce, an ounce and a half, or two ounces, according as it is decayed, of melted falt-petre. Afterwards, thefe ingredients are to be moiftened and mixed well, fo that nothing can be difcerned in the compofition, which may be known by cutting the mafs; and then they granulate it as aforefaid. In cafe the powder be in a manner quite fpoiled, the only way is to extract the falt-petre with water, according to the ufual manner, by boiling, filtrating, evaporating, and cryftallizing; and then with frefh fulphur and charcoal to make it up a-new again.

In regard to the medical virtues of gun-powder, Boerhaave informs us, that the flame of it affords a very healthy fume in the height of the plague: becaufe the explofive acid vapour of nitre and fulphur corrects the air; and that the fame vapour, if received in a fmall clofe pent up place, kills infects.

It is enacted by 5 and 11 of Geo. I. and 5 Geo. II. *c.* 20, that gun-powder be carried to any place in covered carriages; the barrels being clofe jointed; or in cafes, and bags of leather, *&c.* And perfons keeping more than 200 pounds weight of gun-powder, at one time, within the cities of London and Weftminfter, or the fuburbs, *&c.* are liable to forfeitures if it be not removed; and juftices of peace may iffue warrants to fearch for, feize, and remove the fame.

The invention of gun-powder is afcribed by Polydore Virgil to a chymift, who having accidentally put fome of the ingredients

gredients in this compofition in a mortar, and covered it over with a ftone, it happened to take fire, and blew up the ftone. Thevet fays, the perfon here fpoken of was a monk of Friburgh, named Conftantine Anelzen; but Belleforet and others hold it to be Bartholdus Schwartz, or the black; at leaft it is affirmed, that he firft taught the ufe of it to the Venetians, in the year 1380, during the war with the Genoefe. But what contradicts this account, and fhews gun-powder to be of an older date, is, that Peter Mexia, in his Variæ Lectiones, relates, that Alphonfus XI. king of Caftile ufed mortars againft the Moors in a fiege in 1343. Ducange adds, that there is mention made of this powder in the regifters of the chambers of accounts in France, as early as the year 1338, and Frier Bacon, our country-man, mentions the compofition in exprefs terms, in his treatife De nullitate magiæ, publifhed at Oxford, in the year 1216.

GUN-SHOT-WOUNDS, are attended with much worfe confequences than wounds made by fharp inftruments; for the parts are more fhattered and torn, efpecially when the fhot falls upon the joints, bones, or any confiderable part.

In treating thefe wounds, the following rules muft be obferved; to extract all foreign bodies, to ftop the hæmorrhage, to promote fuppuration, to encourage new flefh, and to make an even cicatrix. The extraction of foreign bodies fhould, if poffible, be performed with the hand; or if that cannot be done, with the forceps or a hook. They are eafieft removed at firft; for, after fome delay, the tumour and inflammation of the parts, render it difficult and painful. Sometimes the orifice of the wound is fo narrow, that it will be impoffible to come at the body you have a defire to extract, without making a larger opening; which fhould be done on the moft convenient fide, always obferving that no nerve, blood-veffel, tendon, or ligament lies in the way. And as two balls are frequently concealed in the fame wound, after the removal of one, the furgeon fhould diligently fearch for another, or for any other extraneous body that may be forced in with it, which might protract the cure of the wound. When an attempt is made to extract the ball, or any other extraneous body, the patient fhould be laid in the fame fituation he was in at the time of receiving the wound; for, by frequent changes of fituation, the ball will eafily bury itfelf and get out of your reach. Whenever a ball has penetrated fo deep, that you can eafily feel it with your finger on the fide oppofite to the wound, you fhould examine nicely whether it is fafeft to bring it back by the way it came in, or to make an opening upon it, and draw it out at the oppofite fide. If the wound cannot fafely be enlarged, nor the balls extracted without great pain and danger, they muft be left in the wound, either till the pain is abated, or the paffage rendered fo eafy by fuppuration, that they work themfelves out. On the other hand, extraneous bodies are inftantly to be removed, where there is danger of bringing on convulfions, pain, and an inflammation, by being left behind. If a ball has paffed into any of the cavities of the body, where the extraction of it cannot be attempted with fafety, it is beft to leave it where it has lodged, and to heal the wound: for there have been variety of inftances, where perfons have carried balls within them for many years, without fuffering any inconvenience. Balls lodged in the bones, are to be extracted with roftrated forceps, obferving the fame rules and directions we have already laid down. When this cannot be done, they may be laid hold of with a fort of trepan neceffary to extract balls that are lodged in bones, and that are covered with a large quantity of flefh; as in the thigh bone; but if the ball is fo ftrongly fixed in the bone, as to refift all thefe methods, it muft be left there till the parts fuppurate, and fet it at liberty. Balls that are thrown into the joints are to be removed with all expedition, for delays are here extremely dangerous; but it is fcarce poffible to prevent violent pains, inflammations, and caries of the bones, which generally require amputation of the limb. In wounds from large guns, the joint or bone is frequently grievoufly fhattered, or carried off; in this cafe, it is far better to take off the limb at once, than to fpend a great deal of time in fruitlefs attempts to cure it; for the natural figure of the fhattered joint can never be reftored, and the branches of nerves that were fent to the bone, and the infertion of the tendons and ligaments being torn from it in many places, cannot but bring on violent inflammations and a gangrene; but where the bones are not violently fhattered and broken, the furgeon fhould be

careful in time to remove the ſplinters, and all extraneous bodies, and to treat the wound according to the rules preſcribed above: laſtly, if any large artery is wounded, either in the arms or legs, which will appear by the loſs of blood, the tourniquet ſhould be applied, and the blood being ſtopped, you muſt endeavour to take up the veſſel, by the aſſiſtance of the crooked needle; but if this cannot be done, or if the condition of the wound will allow no hopes of ſucceſs from the future dreſſings, it will be proper to take off the limb a little above the wound.

The wound being cleaned, and the blood ſtopped, the firſt intention is to uſe our utmoſt endeavours to prevent or aſſuage the tumour and inflammation. The wound ſhould be dreſſed up with lint dipped in ſpirits of wine warmed, covering it up with compreſſes wet with the ſame liquor, or with camphorated ſpirit of wine, either alone, or diluted with aqua calcis. Having done this, the next intention is to forward the ſuppuration of the bruiſed and torn parts, and then to fill up the wound with new fleſh, neatly cicatrized; for the method of doing which, ſee the articles Suppuration and Wound.

In gun-ſhot wounds, ſeveral grains of powder frequently penetrate the ſkin of the face, and occaſion deformity, if they are not taken out: which may be done with a pin, or an inſtrument like an ear-picker: but if they are got in too deep to be picked out in this manner, the ſkin muſt be laid open with a fine ſmall lancet, in order to get at them with the inſtruments we have deſcribed. Great care ſhould be taken not to break the grains in taking them out; for that will occaſion very foul ſpots.

GUNSBERG, a town of Germany, in the circle of Swabia, ſituated on the eaſt ſide of the Danube: eaſt long. 10° 15′, north lat. 48° 35′.

GUNTER's line, a logarithmic line, uſually graduated upon ſcales, ſectors, &c. See Scale and Sector.

It is alſo called the line of lines, and line of numbers; being only the logarithms graduated upon a ruler, which therefore ſerves to ſolve problems inſtrumentally in the ſame manner as logarithms do arithmetically. It is uſually divided into an hundred parts, every tenth thereof is numbered, beginning with 1, and ending with 10; ſo that if the firſt great diviſion, marked 1, ſtand for one tenth of any integer, the next diviſion, marked 2, will ſtand for two tenths; 3, three tenths, and ſo on; and the intermediate diviſions will, in like manner, repreſent 100th parts of the ſame integer. If each of the great diviſions repreſent 10 integers, then will the leſſer diviſions ſtand for integers; and if the great diviſions be ſuppoſed each 100, the ſub-diviſions will be each 10.

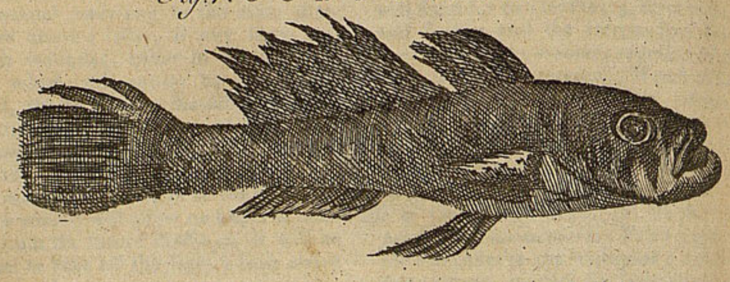
Uſe of Gunter's line. 1. *To find the product of two numbers.* From 1 extend the compaſſes to the multiplier; and the ſame extent, applied the ſame way from the multiplicand, will reach to the product. Thus if the product of 4 and 8 be required, extend the compaſſes from 1 to 4, and that extent laid from 8 the ſame way, will reach to 32, their product. 2. *To divide one number by another.* The extent from the diviſor to unity, will reach from the dividend to the quotient: thus to divide 36 by 4, extend the compaſſes from 4 to 1, and the ſame extent will reach from 36 to 9, the quotient ſought. 3. *To three given numbers, to find a fourth proportional.* Suppoſe the numbers 6, 8, 9; extend the compaſſes from 6 to 8, and this extent, laid from 9 the ſame way, will reach to 12, the fourth proportional required. 4. *To find a mean proportional between any two given numbers.* Suppoſe 8 and 32: extend the compaſſes from 8 in the left-hand part of the line, to 32 in the right; then biſſecting this diſtance, its half will reach from 8 forward, or from 32 backward, to 16, the mean proportional ſought. 5. *To extract the ſquare root of any number.* Suppoſe 25: biſſect the diſtance between 1 on the ſcale and the point repreſenting 25; then the half of this diſtance, ſet off from 1, will give the point repreſenting the root 5. In the ſame manner the cube root, or that of any higher power, may be found by dividing the diſtance on the line, between 1 and the given number, into as many equal parts as the index of the power expreſſes; then one of thoſe parts, ſet from 1, will find the point repreſenting the root required.

Gunter's quadrant, one made of wood, braſs, &c. containing a kind of ſtereographic projection of the ſphere, on the plane of the equinoctial; the eye being ſuppoſed placed in one of the poles.

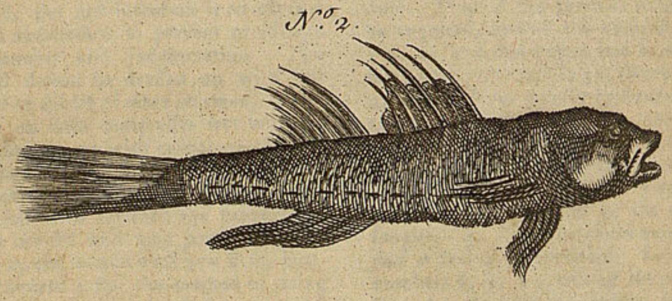
Beſides the uſe of this quadrant in finding heights and diſtances, it ſerves alſo

to

Fig. 1. GOBIUS. No. 1.



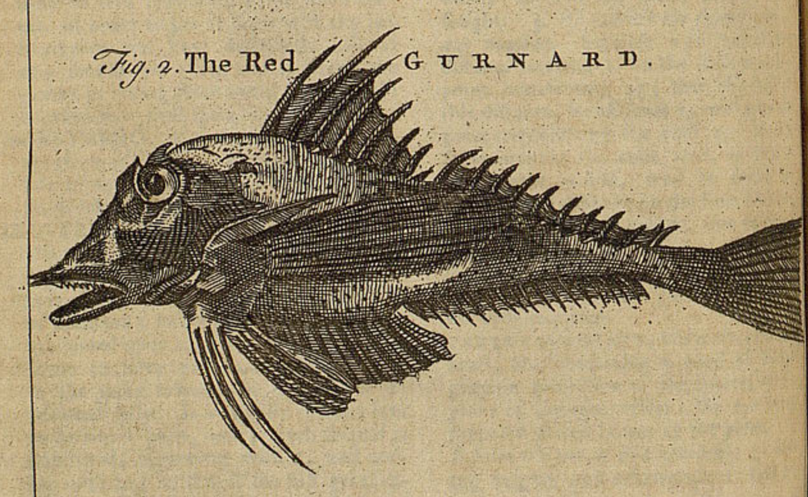
No. 2.



No. 3.



Fig. 2. The Red GURNARD.



T. Jefferys sculp.

to find the hour of the day, the fun's azimuth, and other problems of the globe. See the article QUADRANT.

GUNTER'S SCALE, called by navigators fimply the gunter, is a large plain fcale, generally two feet long, and about an inch and a half broad, with artificial lines delineated on it, of great ufe in folving queftions in trigonometry, navigation, &c. See the article SCALE.

GUN-WALE, or GUNNEL, is the uppermoft wale of a fhip, or that piece of timber which reaches on either fide from the quarter-deck to the forecaftle, being the uppermoft bend which finifhes the upper works of the hull, in that part in which are put the ftanchions which fupport the wafte-trees.

GURIEL, a fubdivifion of Georgia, in Afia, fituated on the eaftern coaft of the Euxine-fea.

GURK, a city of Carinthia in Germany: eaft long. 14°, north lat. 47° 20′.

GURNARD, in ichthyology, the englifh name of two fpecies of trigla. See the article TRIGLA.

Thefe fifhes from their different colours are called the grey and red gurnard. The grey gurnard has a bifid and fpinofe fnout, with two fpines at each eye. The red kind has likewife the roftrum bifid, and the coverings of the gills ftriated, and each of them armed with three fpines. This laft is a very remarkable fpinofe fifh, which feldom exceeds a foot in length. See plate CXXIII. fig. 2. Both thefe fifhes make a fingular noife, when out of the water, not unlike the grunting of a hog; whence their englifh name.

GUSSET, in heraldry, is formed by a line drawn from the dexter or finifter chief points, and falling down perpendicularly to the extreme bafe. See plate CXXI. fig. 7.

The guffet is an abatement of honour, denoting an effeminate perfon. See the article ABATEMENT.

GUSTROW, a town of Germany, in the dutchy of Mecklenburg: eaft long. 12° 15′, north lat. 54°.

GUTS, or INTESTINES, in anatomy. See the article INTESTINES.

GUTSKROW, a city of Germany, in the circle of Upper Saxony, and province of fwedifh Pomerania: eaft long. 13° 40′, north lat. 54°.

GUTTA, a town of Hungary, fituated on the eaft fide of the Danube: eaft long. 18°, north lat. 48° 20′.

GUTTÆ ANGLICANÆ, volatile englifh drops. See the article DROPS.

GUTTÆ, in architecture, are ornaments in the form of little cones, ufed in the plafond of the doric corniche, or on the architrave underneath the triglyphs, reprefenting a fort of drops or bells. They are ufually fix in number. See the article DORIC.

GUTTA SERENA, a difeafe in which the patient, without any apparent fault in the eye, is entirely deprived of fight.

Its caufe is afcribed to an obftruction of the optic nerve, which may proceed from a palfey in the nerve, from a fuppreffion of ufual hæmorrhages, from ulcers healed too foon, or from an epilepfy.

Heifter affirms, that it is to be cured by aromatics, carminatives, and attenuants; chiefly eye-bright, veronica, hyffop, rofemary-flowers, fage, fennel and annifeeds, valerian-root, faffafras, cinnamon and wood-lice, either in infufion, or in powder. The juice of wood-lice newly expreffed, and taken for fome weeks, encreafing the dofe, is of excellent ufe; as likewife mercurials, and fometimes a falivation. If it arifes from a fuppreffion of ufual hæmorrhages, they are to be reftored; but if this cannot be done, artificial bleeding is to be fubftituted.

Coward recommends volatiles, antifcorbutics, chalybeats, mercurials, cephalics, and nervine medicines.

Externally, iffues, fetons, and clyfters, are faid to be good, efpecially in the phlegmatic; but if the patient is plethoric, cupping and bleeding, particularly cauteries, or iffues on the coronal future, or in the neck, are proper: and the eyes may be wafhed with fennel, valerian, eye-bright, or rofe-water: or an infufion of fennel-roots in wine, with bags of ftrengthening herbs and fennel-feeds, may be put upon them. Sneezing powders may likewife be proper, efpecially florentine orrice, or horfe-chefnuts. An old gutta ferena, however, is generally incurable.

GUTTE′, or GUTTY. See GUTTY.

GUTTERS, in architecture, a kind of canals in the roofs of houfes, ferving to receive and carry off the rain.

Gutters, with refpect to their pofition, are of two kinds: fuch as come fomething near a parallelifm with the horizon; and fuch as incline towards a vertical pofition to the horizon.

GUTTER-TYLES, thofe intended for gutters. See the article TYLE.

GUTTURAL, a term applied to letters or sounds pronounced or formed as it were in the throat. There are four guttural letters in the hebrew, *viz.* אהחע, which, for memory's sake, are termed ahachah. See the article LETTER.

GUTTY, *gutté*, in heraldry, a term used when any thing is charged or sprinkled with drops.

In blazoning, the colour of the drops is to be named, as gutty of sable, of gules, &c.

GUY, in a ship, is any rope used for keeping off things from bearing or falling against the ship's sides when they are hoisting in.

That rope which at one end is made fast to the fore-mast, and seized to a single block at the pendant of the garnet, is called the guy of the garnet.

GUY'S HOSPITAL. See HOSPITAL.

GUZES, in heraldry, roundles of a sanguine or murry colour. These, from their bloody hue, are by some supposed to represent wounds.

GYMNIA, in zoology, a class of animalcules, which have no tails, nor any visible limbs. See ANIMALCULE.

This class comprehends the capillary eels, the pepper-water eel, and the vinegar eel.

GYMNARTHRIA, in zoology, a name given that order of insects which have soft naked bodies, furnished with limbs. See the article INSECT.

GYMNASIARCH, γυμνασιαρχης, in antiquity, the director of the gymnasium. He had two deputies under him; the one called xystarch, who presided over the athletæ, and had the oversight of the wrestling; the other, gymnastes, who had the direction of all the other exercises.

GYMNASIUM, γυμνασιον, in grecian antiquity, a place fitted for performing exercises.

Gymnasia, according to Potter, were first used at Lacedæmon, but were afterwards very common in all parts of Greece, and imitated, very much augmented, and improved at Rome. They were not single edifices, but a knot of buildings united, being so capacious as to hold many thousands of people at once, and having room enough for philosophers, rhetoricians, and the professors of all other sciences, to read their lectures; and wrestlers, dancers, and all others that would, to exercise at the same time without the least disturbance or interruption. They consisted of a great many parts, the chief of which were the porticos, elæothesium, palæstra, conisterium, &c. See the articles PORTICO, ELÆOTHESIUM, &c.

Athens had several gymnasia, of which the lyceum, academia, and cynosurges, were those of most note.

The lyceum was situated upon the banks of the river Ilissus, and received its name from Apollo λυκοκτονος, or λυκειος, to whom it was dedicated.

The lyceum was the place where Aristotle taught philosophy, walking there every day till the hour of anointing; whence he and his followers got the name of peripatetics, from περιπατειν, to walk.

The academy was part of the ceramicus without the city, where Plato lectured. See the article ACADEMY.

The cynosurges was a place in the suburbs, near the lyceum, so called from a white or swift dog, κυων αργος. Here Antisthenes instituted a sect of philosophers called cynics, from the name of the place.

GYMNASTICS, the art of performing the several bodily exercises, as wrestling, running, fencing, dancing, &c. See the article WRESTLING, &c.

That part of medicine which regulates the exercises of the body, whether for preserving or restoring health, is also termed gymnastic.

GYMNIC, something belonging to the athletic exercises; for an account of which, see the articles PENTATHLON, OLYMPIC, ISTHMIAN, &c.

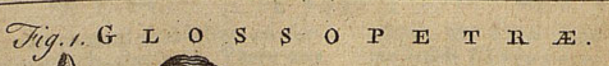
GYMNOPÆDIA, a dance used by the antient Lacedæmonians, and performed during their sacrifices by young persons naked, who at the same time sung a song in honour of Apollo.

GYMNOPYRIS, in natural history, a name given by Dr. Hill to the pyritæ of a simple internal structure, and not covered with a crust.

Of these there are only two species. 1. A green variously shaped kind. 2. A botryoide kind. See PYRITÆ.

The first species is the most common of all the pyritæ, and appears under a great diversity of shapes. It is very hard and heavy, very readily gives fire with steel, but will not at all ferment with aqua-fortis. The second species is very elegant and beautiful, and its usual colour is a very agreeable pale green; but what most distinguishes it from all other pyritæ is, that its surface is always beautifully elevated into tubercles of various sizes, resembling a cluster of grapes. See plate CXXIV. fig. 3.

GYMNOSOPHISTS, a sect of philosophers



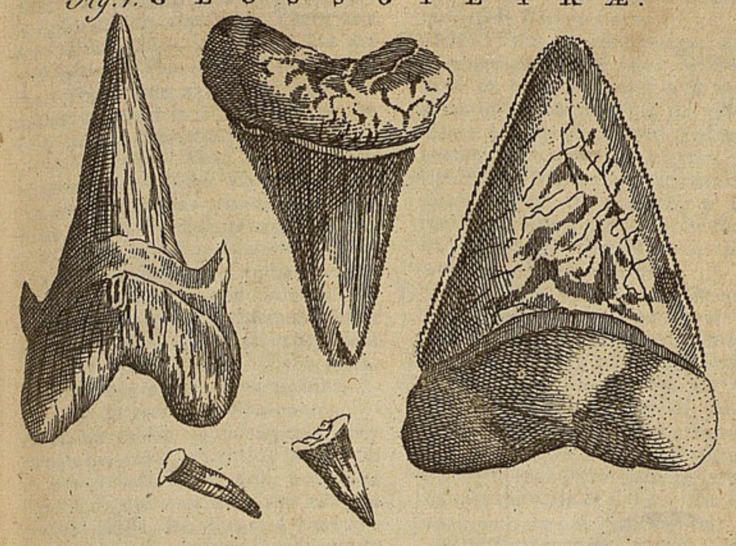


Fig. 2. GRYPHITES.



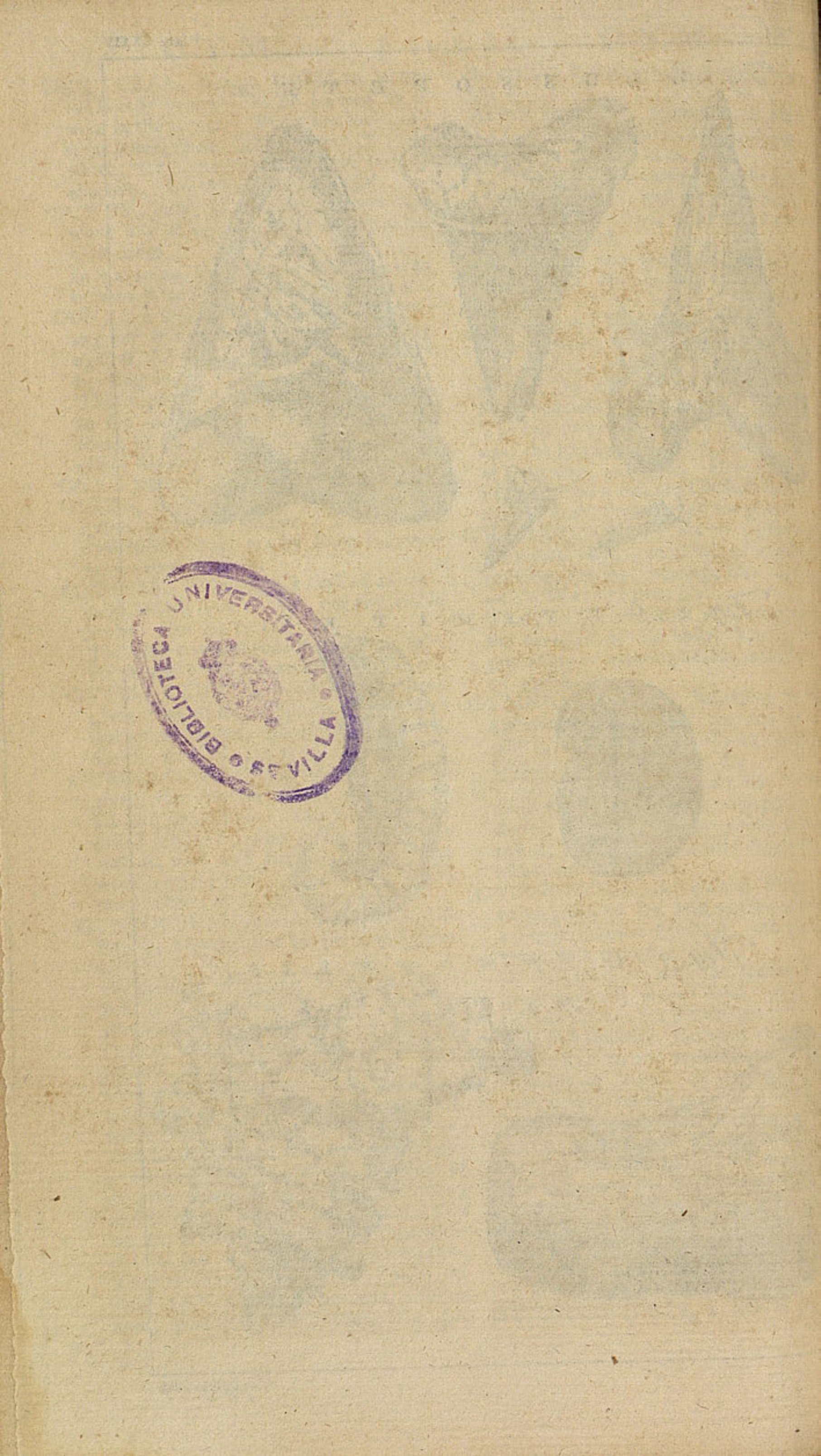


Fig. 3. GYMNOPYRIS.

Sp. 2.

Sp. 1.

T. Jefferys sculp.


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phers who cloathed themfelves no farther than modefty required. There was fome of thefe fages in Africa; but the moft celebrated clan of them was in India. The african gymnofophifts dwelt upon a mountain in Ethiopia, near the Nile, without the accommodation either of houfe or cell. They did not form themfelves into focieties like thofe of India, but each had his private retirement, where he ftudied and performed his devotions by himfelf. If any perfon had killed another by chance, he applied to thefe fages for abfolution, and fubmitted to whatever penances they enjoined. They obferved an extraordinary frugality, and lived only upon the fruits of the earth. Lucan afcribes to thefe gymnofophifts, feveral new difcoveries in aftronomy.

As to the indian gymnofophifts, they dwelt in the woods, where they lived upon the wild products of the earth, and never drank wine, nor married. Some of them practifed phyfic, and travelled from one place to another: thefe were particularly famous for their remedies againft barrennefs. Some of them, likewife, pretended to practife magic, and to foretel future events.

In general, the gymnofophifts were wife and learned men: their maxims and difcourfes, recorded by hiftorians, do not in the leaft favour of a barbarous education, but are plainly the refult of great fenfe, and deep thought. They kept up the dignity of their character to fo high a degree, that it was never their cuftom to wait upon any body, not even upon princes themfelves; for which reafon Alexander, who would not condefcend to vifit them in perfon, fent fome of his courtiers to them in order to fatisfy his curiofity. Their way of educating their difciples, is very remarkable. Every day, at dinner, they examined them how they had fpent the morning; and every one was obliged to fhew, that he had difcharged fome good office, practifed fome virtue, or improved in fome part of learning: if nothing of this appeared, he was fent back without his dinner. They held a tranfmigration of fouls; and it is probable that Pythagoras borrowed his doctrine from them.

GYMNOSPERMIA, in botany, a feries or fub-divifion of the didynamia clafs of plants; comprehending all thofe with labiated flowers, without any pericarpium or capfule furrounding their feeds, which are only lodged in the bafe of the cup; whence the name gymnofpermia. See the article DIDYNAMIA.

GYMNOTUS, in ichthyology, a genus of malacopterygious fifhes, without any back or belly-fins, and with only five bones in the membrane of the gills.

There is only one known fpecies of this genus, the carapo of Marcgrave.

GYNÆCEUM, among the antients, the apartment of the women, a feparate room in the inner part of the houfe, where they employed themfelves in fpinning, weaving, and needle-work.

GYNÆCOCRACY, γυναικοκρατεια, denotes the government of women, or a ftate where women are capable of the fupreme command. Such are Britain and Spain.

GYNANDRIA, in botany, the name of one of Linnæus's claffes of plants, the twentieth in order; comprehending all the plants whofe ftamina are placed either on the ftyle or on the receptacle, elongated into the form of a ftyle, and carrying on it both the piftil and ftamina. See the article BOTANY.

Of the feveral genera of this clafs, fome have two ftamina to each flower; fome, again, have three; and others, four, five, fix, ten, or more. And hence they are naturally arranged into feveral diftinct orders, under the appellations of gynandria-diandria, gynandria-triandria, &c.

GYNGLIMUS, or GINGLYMUS, in anatomy. See the article GINGLYMUS.

GYPSIES, or EGYPTIANS, are, in our ftatutes, termed a counterfeit kind of rogues, who, difguifing themfelves both in their fpeech and apparel, wander up and down the country, pretending to tell fortunes, cure difeafes, &c. under which pretence, they abufe the ignorant, common people, by ftealing and pilfering from them every thing that is portable, and which they may carry off undifcovered. In order to fupprefs thefe impoftors, feveral ftatutes have been made; for by 28 H. 8. c. 10. Egyptians coming into England are to depart the realm in fifteen days, or may be imprifoned; and if they continue here above a month, fhall be deemed guilty of felony. 5 Eliz. c. 20. Probably they might be fo called from the antient Egyptians, who had the character of great cheats, whence the name might afterwards pafs proverbially into other languages, as it did into the Greek and Latin; or elfe the antient Egyptians being much verfed in aftronomy, or rather aftrology, the name was afterwards affumed by thefe modern fortune

tune-tellers. Be that as it will, there is scarce any country in Europe without its gypsies. The Latins call them Egyptii; the Italians, Cingari and Cingani; the French, Bohemiens; others, Saracens, Tartars, *&c.* The first time we heard of them in England was in 1536.

GYPSOPHILA, in botany, a genus of the decandria-digynia class of plants, the corolla of which consists of five oval, obtuse, patent petals; the fruit is a globose capsule, composed of five valves, and containing only one cell, in which are many roundish seeds.

GYPSUM, or PLASTER-STONE, in natural history, a genus of fossils naturally and essentially simple, not inflammable nor soluble in water, and composed of small flat particles; which form bright, glossy, and in some degree transparent masses, not flexible or elastic, not giving fire with steel, nor fermenting with or being soluble in acid menstrua, and very easily calcining in the fire.

Of these gypsums, some are harder, others softer; and are of several colours, as white, grey, red, green, *&c.* Sometimes distinct, and sometimes variously blended together.

The texture of all the gypsums being ultimately the same, it may be sufficient to observe, that their origin is plainly from particles of a determinate nature and substance, and of a certain and invariable figure, an oblong, flat, and irregularly angular one. These we sometimes see, as indeed is most natural to them, disposed without order or regularity, into loose, complex, friable masses; at others, they are getting out of their native order, and emulating the structure of other classes of bodies, of which they are indeed properly the basis, and appearing somewhat in the figure of the fibrariæ; and at other times, of the foliaceous composite flakes of the selenitæ; the species which have these structures, are truly varying from the gypsums into those bodies they emulate; for the fibrariæ are only a peculiar arrangement of these very particles, and the selenitæ only more broad flakes of the same, like those of the foliaceous talcs.

The gypsums are much used in plaster, for stuccoing rooms, and casting busts and statues.

GYPSUM STRIATUM, *striated plaster-stone*, the whitish, less glossy tricheria, with short thick filaments. See TRICHERIA.

GYRFALCON, or GERFALCON. See the article GERFALCON.

GYRLE, or GIRLE, among sportsmen. See the article GIRLE.

GYSHORN, a town of Germany, in the dutchy of Lunenburg, situated on the river Aller, forty-five miles north-east of Hanover: east longitude 10° 45', north latitude 52° 50'.

H.

H, or h, the eighth letter, and sixth consonant in our alphabet; tho' some grammarians will have it to be only an aspiration, or breathing. But nothing can be more ridiculous than to dispute its being a distinct sound, and formed in a particular manner by the organs of speech, at least in our language: witness the words *eat* and *heat*, *arm* and *harm*, *ear* and *hear*, *at* and *hat*, &c. as pronounced with or without the *h*.

It is pronounced by a strong expiration of the breath between the lips, closing, as it were, by a gentle motion of the lower jaw to the upper, and the tongue nearly approaching the palate.

There seems to be no doubt, but that our *h*, which is the same with that of the Romans, derived its figure from that of the hebrew ה. And, indeed, the Phœnicians, most antient Greeks and Romans, used the same figure with our H, which in the series of all these alphabets keeps its primitive place, being the eighth letter.

H, used as a numeral, denotes 200; and with a dash over it, $\bar{H}$, 200,000.

As an abbreviation, H was used by the antients to denote *homo*, *hæres*, *hora*, &c.

Thus

Thus H. B. ſtood for hæres bonorum; and H. S. corruptly for L. L. S. a ſeſterce; and H. A. for Hadrianus.

HAAG, a town of Germany, and circle of Bavaria, thirty-two miles north-weſt of Munich.

HABAT, the north-weſt province of the empire of Morocco, ſituated on the ſtreights of Gibraltar.

HABBAKUK, or the prophecy of Habbakuk, a canonical book of the Old Teſtament.

There is no mention made in ſcripture, either of the time when this prophet lived, or of the parents from whom he was deſcended; but according to the authors of the lives of the prophets, he was of the tribe of Simeon, and a native of Bethzacar. As he foreſaw the taking of Jeruſalem by Nebuchadnezzar, he fled to Oſtracin in Arabia, where he lived for ſome time; but after the Chaldeans had made themſelves maſters of Jeruſalem, and were on their return home, he returned into Judæa, where he employed himſelf in agriculture; but as he was carrying the reapers their dinner, he is ſaid to have been tranſported by an angel to Babylon, with what he had provided for his people in the field; which he ſet before Daniel, who was ſhut up in the lion's den, and was tranſported back again to Judæa, where he died, before the end of the captivity.

He is reported to have been the author of ſeveral prophecies which are not extant: but thoſe that are indiſputably his, are contained in three chapters. In theſe the prophet complains very pathetically of the diſorders which he obſerved in the kingdom of Judæa. God reveals to him, that he would ſhortly puniſh them in a very terrible manner by the arms of the Chaldæans. He foretels the conqueſts of Nebuchadnezzar, his metamorphoſis, and death. He foretels, that the vaſt deſigns of Jehoiakim would be fruſtrated. He ſpeaks againſt a prince (probably the king of Tyre) who built with blood and iniquity; and he accuſes another king (perhaps the king of Egypt) of having intoxicated his friend, in order to diſcover his nakedneſs. The third chapter is a ſong or prayer to God, whoſe majeſty he deſcribes with the utmoſt grandeur and ſublimity of expreſſion.

HABDALA, a ceremony of the Jews, obſerved on the ſabbath in the evening, when every one of the family is come home. At that time, they light a taper, or lamp, with two wicks at leaſt: the maſter of the family then takes a cup with ſome wine, mixed with fragrant ſpices; and, after having repeated a paſſage or two of ſcripture, as, for example, "I will take the cup of ſalvation, *&c.*" Pſal. cxvi. and, "The Jews had light "and gladneſs, *&c.*" Eſth. viii. he bleſſes the wine and ſpices. Afterwards he bleſſes the light of the fire, and then caſts his eye on his hands and nails, as remembring that he is going to work. The whole is intended to ſignify that the ſabbath is over, and is from that moment divided from the day of labour which follows. For this reaſon the ceremony is called habdala, which ſignifies diſtinction.

HABEAS CORPORA, in law, a writ iſſued for bringing in a jury, or ſuch of them as refuſe to appear upon the venire facias, for the trial of a cauſe brought to iſſue.

It commands the ſheriff to have the jurors before the judges on ſuch a day, *&c.* and is of the ſame nature in the common pleas, as the diſtringas juratores in the court of king's bench.

HABEAS CORPUS, in law, is a writ of two kinds, the one being the great writ of the engliſh liberty, which lies where a perſon is indicted for any crime or treſpaſs before juſtices of the peace, or in a court of any franchiſe, and on being impriſoned, has offered ſufficient bail, which has been refuſed, tho' the caſe be bailable; in which caſe he may have this writ out of the king's bench, in order to remove himſelf thither, to anſwer the cauſe at the bar of that court.

The practice in this caſe, is firſt to procure a certiorari out of the court of chancery, directed to all the juſtices for removing the indictment into the king's bench; and upon that to obtain this writ, directed to the ſheriff, for cauſing the body of the party to be brought at a certain day.

The other kind of habeas corpus is uſed for bringing the body of a perſon into court, who is committed to any gaol or priſon, either in criminal or civil cauſes; which writ will remove the perſon and cauſe from one court and priſon to another.

No habeas corpus, or other writ, to remove a cauſe from out of an inferior court, can be allowed, if the ſame be not delivered to the judge of the court, be-

fore the jury who are to try the caufe have appeared, and before any of them are fworn, 43 Eliz. c. 5.

The habeas corpus act, 31 Car. II. c. 2. has ordained, that a perfon may have a habeas corpus from any judge, on complaint made and view of the warrant of commitment, (except fuch perfon is committed for treafon or felony expreffed in the warrant, or fome other offence that is not bailable) which habeas corpus muft be made returnable immediately; and on producing a certificate of the caufe of commitment, the prifoner is to be difcharged on bail given to appear in the court of king's bench the next term, or next affizes, *&c.* Perfons committed for either treafon or felony, exprefsly mentioned in the warrant, upon a motion made in open court, in the firft week of the term, or day of feffions, *&c.* after commitment, are to be brought to trial; and if they are not indicted the next term or feffions after commitment, on a motion made the laft day of that term, they fhall be let out upon bail, except it appear on oath that the king's witneffes are not ready; and in cafe they are not indicted or tried the fecond term after commitment, they fhall be difcharged.

Judges denying a habeas corpus, fhall forfeit 500 l. and if an officer refufe to obey it, or to deliver a true copy of the commitment-warrant, he forfeits 100 l. for the firft offence.

Habeas corpus *ad profequendum*, a writ for the removal of a perfon in order to profecution and trial in the proper county.

Habeas corpus *ad faciendum et recipiendum*, a writ iffued out of the court of common-pleas, on behalf of defendants fued in inferior courts, to remove their caufe into the faid court.

Habeas corpus *ad refpondendum*, a writ that lies where a perfon is imprifoned at another's fuit in any prifon except that of the king's bench; and a third perfon would fue the prifoner there, in which cafe this writ will remove fuch prifoner from the prifon where he is, into the king's bench, to anfwer the action in that court.

Habeas corpus *ad fatisfaciendum*, a writ that lies againft a perfon in the fleet-prifon, *&c.* to charge him in execution. The delivery of this writ to the warden, is fufficient.

HABENDUM, in law, a term fignifying to have and to hold.

A deed or conveyance has two principal parts; the premifes and the habendum. The office of the firft is to exprefs the names of the grantor, the grantee, and the things granted: that of the habendum, to fhew what eftate or intereft the grantee is to have in what is granted. According to lord Coke, the habendum is to limit the eftate, fo that the general implication, which by conftruction of law paffes in the premifes, is by the habendum controlled and qualified. Thus in a leafe to two perfons, to have and to hold to the one for life, alters the implication of the joint tenancy in the freehold, which would pafs by the premifes, were it not for the habendum.

HABERDASHER, in commerce, a feller of hats, or of fmall wares.

The mafter and wardens of the company of haberdafhers in London, calling to their affiftance one of the company of cappers, and another of the hat-makers, and mayors, *&c.* of towns, may fearch the wares of all hatters that work hats with foreign wool, and have not been apprentices to the trade, or who dye them with any thing but copperas and galls, or woad and madder; in which cafe they are liable to penalties, by ftat. 8. Eliz. c. 7. and 5 Geo. II. c. 22.

HABERE facias *poffeffionem*, a writ that lies where one has recovered a term for years in an action of ejectment, in order to put him into poffeffion again.

The fheriff is obliged to execute this writ, and may raife the poffe comitatus to affift him, in cafe he be oppofed. He may alfo break open a houfe into which entrance is denied, to deliver poffeffion to the perfon recovering by law. But an action of the cafe lies againft him, if he deliver poffeffion of more than is contained in the writ.

Habere facias *feifinam*, a writ which lies where a perfon has recovered land in the king's court; directed to the fheriff, commanding him to give feifin of the land recovered.

This writ fometimes iffues out of the records of a fine, and requires the fheriff to give the cognifee, or his heirs, feifin of the land in which the fine is levied.

There is likewife a writ called, habere facias feifinam, ubi rex habuit annum, diem & vaftum, that lies for the delivery of lands to the lord of the fee, after the king has had his year, day and wafte, in the lands of one convicted of felony.

Habere facias *vifum*, is a writ that lies in divers cafes, as in dower, formedon, *&c.*

&c. where it is neceſſary to take a view of the lands or tenements in queſtion.

HABERGION, a ſmall coat of mail, or only ſleeves and gorget of mail, formed of little iron rings, or maſhes linked into each other. See the article GORGET.

HABILIMENTS *of war*, in our antient ſtatutes, ſignify armour, harneſs, utenſils, or other proviſions for war, without which there is ſuppoſed no ability to maintain war.

HABIT, in philoſophy, an aptitude or diſpoſition either of mind or body, acquired by a frequent repetition of the ſame act. This habit is by ſome of the ſchoolmen termed *habitus qualitativus*, a qualitative habit, and defined, a quality adventitious to a thing, fitting and diſpoſing it either to act or ſuffer. Others again define habit an affection of the mind or body, perſiſting by long uſe and continuance. Hence habits may be diſtinguiſhed into thoſe of the mind and of the body: thus virtue is called an habit of the mind, ſtrength, an habit of the body. All natural habits, whether of body or mind, are no other than the body and mind themſelves conſidered as either acting or ſuffering; or they are modes of the body or mind wherein either perſeveres, till effaced by ſome contrary mode.

Cuſtom, ſays Mr. Locke, ſettles habits of thinking in the underſtanding, as well as of determining in the will, and of motions in the body, all which ſeem to be but trains of motion in the animal ſpirit, which once ſet a going, continue on in the ſame ſteps they have been uſed to, which by often treading are worn into a ſmooth path, and the motion in it becomes eaſy as well as natural. See ASSOCIATION.

The archbiſhop of Cambray defines habits in general to be the certain impreſſions left in the mind, by means whereof we find a greater eaſe, readineſs and inclination to do any thing formerly done, by having the idea ready at hand to direct us how it was done before. Thus, for example, we form the habit of ſobriety, by having always before us the inconveniencies of exceſs; the reflections whereof being often repeated, render the exerciſe of that virtue continually more and more eaſy.

Malebranche gives a more mechanical theory of habits. His principle is, that they conſiſt in a facility which the ſpirits acquire of paſſing eaſily from one part of the body into another. He argues thus: if the mind act on, and move the body, it is in all probability by means of a ſtock of animal ſpirits lodged in the brain, ready to be ſent at the motion of the will, by means of the nerves which open or terminate in the brain, into the muſcles of the body.

Now an influx of ſpirits into a muſcle occaſions a ſwelling, and of courſe a ſhortening of the muſcle, and conſequently a motion of that part to which the muſcle is faſtened. Further, the ſpirits do not always find all the roads open and free through which they are to paſs: whence that difficulty we perceive of moving the fingers with that quickneſs neceſſary to play on a muſical inſtrument, or of moving the muſcles neceſſary to pronounce the words of a foreign language. But by degrees the ſpirits, by their continual flux, ſmooth the way ſo, that at length they meet with no reſiſtance at all. Now it is in this facility the ſpirits find of paſſing, when directed into the members of the body, that habits conſiſt.

HABIT, in medicine, denotes the ſettled conſtitution of the body, or the habitude of any thing elſe, as the ſtructure or compoſition of a body, or the parts thereof.

HABIT is alſo uſed for a dreſs or garb, or the compoſition of garments, wherewith a perſon is covered; in which ſenſe we ſay the habit of an eccleſiaſtic, of a religious, &c. a military habit, &c.

The different habits and cloths that the generality of the world wear, are, through inadvertency and inattention, very frequently the cauſe of very unhappy maladies. The antients have obſerved the inconveniencies of many parts of dreſs; and daily obſervations confirm to us the many miſchiefs the ladies ſuffer from the ſtiff whale-bone ſtays they wear, and the diſorders of the viſcera of the lower belly to which thoſe are ſubject who lace themſelves too tightly; and this is not only of dangerous conſequence to themſelves, but frequently is the death of children in breeding women. The tight binding of the neck by the mens neck-cloths, ſtocks, or the two tight collars of their ſhirts, &c. has been very frequently the occaſion of very terrible diſorders of the head, the eyes, and the breaſt; deafneſs, vertigoes, faintings, and bleedings at the noſe, are the frequent conſequences of this practice.

Mr. Winſlow has obſerved, that the different motions of the bones of the foot, which are very free in their natural ſtate, as is very plainly ſeen in young children, are

are usually wholly lost to us as we grow up, by means of the improper pressure of our shoes. The high-heeled shoes the women wear, entirely changes the natural conformation of the bones of the whole foot.

Angelic HABIT or GARMENT, among our anceſtors, was a monkiſh garment, which laymen put on a little before their death, that they might have the benefit of the prayers of the monks. It was from them called angelic, becauſe they were called *angeli*, who, by theſe prayers, *animæ ſaluti ſuccurabant*.

HABITATION, or COHABITATION, in law. See the article COHABITATION.

HABITUAL, ſomething grown to a habit by long uſe. See the article HABIT.

HABITUAL GRACE, among divines. See the article GRACE.

HABITUDE, among ſchoolmen, the reſpect or relation one thing bears to another. See RELATION.

Some of the more preciſe ſchoolmen conſider habitude as a genus, and ſub-divide it into two ſpecies; where it is conſidered as quieſcent, they call it reſpect; where as moved, relation: to which ſome add a third ſpecies, conſidered in reſpect of figure, which they call mode.

HABITUDE is alſo uſed by philoſophers for what we commonly call habit, or a certain diſpoſition or habitude for the performing or ſuffering certain things, acquired by repeated acts of the ſame kind.

HACHA, a town of Terra firma, in South America, ſituated on the north ſea, at the mouth of the river Hacha, in weſt long. 72°, north lat. 11° 30′.

HACKNEY, a village on the north-eaſt ſide of London, with a handſome church, three meeting-houſes, and ſeventeen alms-houſes.

HACKNEY-COACH. See COACH.

HADDINGTON, a parliament-town of Scotland, about eighteen miles eaſt of Edinburgh.

HADDOCK, the engliſh name of a well known fiſh of the gadus-kind, with a bearded mouth, and three fins on the back: its body is whitiſh; the upper-jaw longeſt, and the tail a little forked. See the article GADUS.

HADE, among miners, ſignifies the ſteep deſcent of a ſhaft, or the like paſſage.

HADEMAR, a town of Germany, in the circle of the Upper Rhine, and county of Naſſau in the Weteraw, ſituated in 7° 45′ eaſt longitude, and 50° 26′ north latitude.

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HADERSLEBAN, a town of Sleſwick, or ſouth Jutland, ſituated near the ſea called the little Belt, in eaſt longitude 10°, north latitude 55° 15′.

HADLEY, a market-town of Suffolk, ſituated ſeventeen miles ſouth-eaſt of Bury.

HADRAMUT, a city of Arabia Fælix, the capital of the province of Hadramut, ſituated in eaſt longitude 50° 30′, north latitude 16°, three hundred and ſixty miles north-eaſt of Mocho.

HÆMACHATES, in natural hiſtory, the variegated, blood-coloured agat of the antients. See the article AGAT.

HÆMAGOGOS, among phyſicians, a compound medicine, conſiſting of fetid and aromatic ſimples, mixed with black hellebore; and preſcribed in order to promote the menſtrual and hæmorrhoidal fluxes, as alſo to bring away the lochia. See the article MENSES, &c.

HÆMANTHUS, GUINEA-ORCHIS, in botany, a genus of the hexandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, erect, and divided into ſix erect linear ſegments; the tube is very ſhort, and angular: the fruit a roundiſh berry, containing three cells; the ſeeds are ſingle and triquetrous; the involucrum has ſometimes ſix leaves.

The flowers ſtand at the top in a kind of little umbel, and are of a very beautifully ſtellated appearance.

HÆMATITES, BLOOD-STONE, in natural hiſtory, an extremely rich and fine iron-ore. See the article IRON.

It is very ponderous, and is either of a pale red, a deeper red, or a bluiſh colour; uſually of a very gloſſy ſurface; and when broken, of a fine and regularly ſtriated texture: the ſtriæ converging toward the center of the body; and the maſſes thereof naturally breaking into fragments of a broad baſe and pointed end; appearing ſomething pyramidal. The hæmatites is various in its degrees of purity and hardneſs, as well as in its figure: the fineſt and moſt pure is of a botryoide ſurface; the whole ſuperficies riſing into larger or ſmaller roundiſh tubercles: ſometimes the hæmatites is of a coarſe texture, and a laxer ſtructure, in which ſtate it is known to many by the name ſchiſtus.

The hæmatites, beſides its value as an ore, has its uſes in medicine: the higheſt coloured and moſt like cinnabar that can be had, being eſteemed aſtringent and deſiccative. It is given in powder from

ten

ten grains to five and twenty for a dose, in hæmorrhages; and is also used in distemperatures of the eyes.

HÆMATOPUS, the SEA-PYE, in ornithology, a distinct genus of birds of the order of the scolopaces, with a compressed beak, terminating in a wedge-like point. The hæmatopus is of the bigness of the common magpye, and is so called from the colour of its legs, which are of a bright scarlet.

HÆMATOSIS, among physicians, the same with sanguinification. See the article SANGUINIFICATION.

HÆMATOXYLUM, CAMPEACHY-WOOD, in botany, a genus of the decandria-monogynia class of plants, the flower of which consists of five equal and ovated petals; the fruit is a lanceolated, obtuse and unilocular, bivalve capsule, containing a few compressed, oblong seeds. See the article CAMPEACHY.

HÆMOPTOSIS, HÆMAPTYSIS, or HÆMOPTOE, in medicine, a spitting of blood.

An hæmaptysis is either accidental or habitual, and is stopped by astringents, as bole-armenic, dragon's blood, and the lapis hæmatites, and best and most safely cured by the peruvian bark. In this disorder purging is to be avoided, but bleeding is convenient; diuretics and diaphoretics are of use, but opiates are excellent; in particular semen hyosciami is a noble specific, commended both by the antients and moderns, yet it is to be given with great precaution, in small quantities, and often repeated; for when given in too large a dose, it occasions a delirium: hedera terrestris, or ground-ivy, produces marvelous effects.

In a desperate accidental hæmaptysis, other things being tried in vain, (as in all other hæmorrhages) the expectation of the physician is seldom frustrated, if he makes use of the following remedy. Take plantain water and red wine, of each half a pound; syrup of poppies, half an ounce; to these add a very small quantity of the oil of vitriol, and make the whole up into a julep.

In cases of extremity, the fumes of quick lime and vinegar, are said to be very good.

HÆMORRHAGE, in medicine, a flux of blood from any part of the body.

Hæmorrhages are divided by medical writers into natural and preternatural.

Natural hæmorrhages comprehend bleeding at the nose, spitting of blood, the fluxes of the hæmorrhoids and menses, the lochia in lying-in women, vomiting of blood, and voiding of blood by urine.

The preternatural hæmorrhages are such as derive their origin from external accidents, as falls, blows, and wounds: some also comprehend under this term the artificial evacuations by bleeding, cupping, and the like.

Hæmorrhages differ much according to the age and state of the patient, and other accidents: hæmorrhages from the nose, are most frequent in young persons; those of the hæmorrhoides, in persons of a middle age, or later in life; the spitting of blood, to persons in a middle age; and voiding of blood by urine, usually to older people.

Some hæmorrhages are periodical, and others vague or uncertain. The first observe some stated periods of time for their return upon people: the last are wholly uncertain in that particular. Some are also termed critical; these are such as happen in the crisis of fevers. There are usually violent pains about those parts whence natural hæmorrhages are to proceed; but these always go off as soon as the bleeding comes on in due quantity. Young persons of a healthy and florid constitution, are most subject to hæmorrhages: people of plethoric habits, are also much subject to them; and especially such whose blood is found and fluxile, not subject to any dyscracy; those who drink much wine, or eat high seasoned food; and chiefly those persons who are subject to violent passions, especially anger: hence it is that brutes are rarely afflicted with them. The principal causes therefore of hæmorrhages are plethora, violent commotions of the body, hot foods and liquors, a heat of the season, a sudden cooling of the body after violent heat, and passion.

As to the prognostics of hæmorrhages, it may in general be observed, that those proceeding from the lungs, vomiting, and voiding blood by urine, are all very dangerous. The others, when regulated, and in due proportion, are salutary, and often prevent diseases. But the common custom of stopping them by astringents, or otherwise, is often productive of stagnations, inflammations, and violent fevers.

Natural hæmorrhages are more particularly,

HÆMORRHAGE, or BLEEDING *at the nose*,

is owing to the more plentiful appulse of blood to the nostrils, by a stronger motion of the heart, whereby the small arteries in the pituitary coat become turgid, and too much distended, till at length they gape, and the blood gushes out. A bleeding at the nose may be promoted when persons of sedentary lives, that indulge their appetites, and so become plethoric, put their blood into extraordinary agitation, by any of the causes already mentioned, or by volatile medicines, hot baths, or suddenly chilling their feet, &c. This hæmorrhage differs much as to the quantity, some lose only a few drops, some several ounces, and some five or six pounds. No hæmorrhage is more apt to return; which it does to some in a few days, to others in a few hours. To the plethoric it is generally salutary; and there are many instances of a vertigo, scotomia, dull, heavy pains of the head, a phrensy, and even an epilepsy, being carried off by it. On the contrary, from its suppression there have arisen vertigoes, apolexies, epilepsies, convulsions, noise in the ears, hardness of hearing, and even a gutta serena.

But enormous and long continued bleedings at the nose, when they arise from spasms of the internal parts, and are preceded with coldness of the extreme parts, and fainting fits, generally occasion death: it is also dangerous in spotted and malignant fevers, and in chronical diseases. If the bleeding is very inordinate, it will be proper to use cooling emulsions, gentle or stronger opiates, to moderate the spastic strictures, as occasion shall require. Camphor mixed with nitre and calx of antimony, will be highly necessary, if the matter of exanthemata or cutaneous eruptions is the cause of the hæmorrhage, as is often the case. A revulsion may be made from the head by bleeding in the lower parts; then by temperate pediluvia, and putting the hands into warm water. After a revulsion by bleeding, there is nothing equal to nitre, to appease the orgasm of the blood; next to these are vegetable acids, such as the juice of seville-oranges, barberries, the water and juice of wood sorrel; but more especially the diluted spirit of vitriol, tincture of roses, &c.

Externally refrigerants may be mixed with discutients, and applied to the forehead, nose, and neck. In persons of a bilious constitution, cold water alone drank freely, has a good effect.

HÆMORRHAGE *of the hæmorrhoids*, or *of the piles.* See HÆMORRHOIDS.

HÆMORRHAGE *of the lochia*, in lying-in women. See the articles LOCHIA and DELIVERY.

HÆMORRHAGE *of the menses.* See the article MENSES.

HÆMORRHAGE *of the lungs.* See the articles BLOOD and HÆMOPTOSIS.

HÆMORRHAGE *of the urinary passages*, a disorder commonly called pissing of blood, being an emission of blood, with or without urine, from the vessels of the kidneys or bladder, which may be either enlarged, broken, or eroded; and is more or less dangerous, according to the different circumstances that attend it. If pure blood is voided suddenly, without interruption, and without pain, we conclude, says Hoffman, it proceeds from the kidneys. It likewise comes from the kidneys if the urine is coffee-coloured, or more florid, and generally precedes a fit of the gravel: it sometimes accompanies the passage of a stone through the ureter: but if the blood is of a dark colour, with or without purulent matter, emitted with heat and pain in the pubes, and in a small quantity, it certainly proceeds from the bladder. It may be occasioned by a stoppage of the hæmorrhoidal flux; from a violent motion of the body, especially riding; from a stone concealed in the kidney; from an erosion and ulcers of the bladder; from external violence; from griping pains caused by violent purges; from sharp diuretics, especially cantharides.

All bloody urine has some degree of danger, but it is most so when mixed with purulent matter.

If the patient is plethoric, or it proceeds from a sanguineous evacuation, bleeding is necessary, as also cooling nitrous draughts, and purified nitre mixed with absorbents, with whey for a vehicle, or barley-broth, or small-beer acidulated with drops of the spirit of vitriol. The body must be kept open with laxatives, as rhubarb, with currants; or with cream of tartar; also emollient clysters. The relaxed vessels must be agglutinated with decoctions of vulnerary herbs, such as agrimony, ground-ivy, yarrow, golden-rod, and the roots of comfry dulcified with virgin-honey, to which milk may be occasionally added.

If there is an ulcer in the kidneys or bladder, medicines must be given that sheath the acrimony, such as syrup of

marsh-

marſh-mallows, alſo infuſions of the vulnerary herbs above-mentioned, likewiſe of the barks of acacia, cherry-tree, and gum.

When grumous blood plugs up the paſſage of the ureter into the bladder, or the ſphincter of the bladder, and occaſions a difficulty or ſtoppage of urine, warm water drank plentifully, and baths of the ſame, are uſeful: likewiſe warm water ſhould be injected into the bladder with a ſyringe, that the ſharp humour may be diluted, and the grumes diſſolved: but if the urine ſhould be quite ſtopped with a ſpaſm, then give emulſions of the four cold ſeeds, with crabs eyes, and calx of antimony. Externally apply a bladder filled with a decoction of emollient flowers in milk to the abdomen, and keep the body open with manna, or an emollient oily clyſter. Milk and whey are likewiſe excellent in theſe diſorders, if a dram of bole armenic is taken in every draught.

It is an error of fatal conſequence to give aſtringents in theſe diſorders, which ſtop the flux too ſuddenly.

For ſuch preternatural hæmorrhages as derive their origin from external accidents, as falls, blows, and wounds, ſee the articles CONTUSION, WOUND, FISSURE, CONTRAFISSURE, &c.

For artificial hæmorrhages by bleeding, cupping, and the like, ſee the articles PHLEBOTOMY, CUPPING, &c.

For the critical hæmorrhages in fevers, &c. See the article FEVER, &c.

HÆMORRHOIDAL, an appellation given by anatomiſts to the arteries and veins going to the inteſtinum rectum. The internal hæmorrhoidal artery is a branch of the inferior meſenteric; and the external one, a branch of the iliac. The hæmorrhoidal veins are branches of the hypogaſtrics.

HÆMORRHOIDS, or PILES, in medicine, an hæmorrhage, or flux of blood from the hæmorrhoidal veſſels. See HÆMORRHAGE, and HÆMORRHOIDAL.

When the hæmorrhoidal veſſels only ſwell, and diſcharge no blood, but are exceeding painful, this is termed the blind piles.

All copious fluxes of the blood from the anus, are not to be reckoned of the morbous kind. For the habit of body, ſtrength, age, and temperament, of the patient are to be conſidered. That which is enormous and exceſſive to one perſon, may be moderate and ſalutary to another. That only is to be eſteemed pernicious, which continues too long, and enfeebles the patient, whereby the digeſtion, nutrition, and other functions are hurt, and there is reaſon to fear the production of dangerous chronical diſeaſes. An extenſive hæmorrhoidal flux is generally preceded by a heavy preſſing pain of the back and loins: ſometimes a numbneſs of the legs and thighs; a conſtriction of the external parts, with a ſlight ſhivering, and a ſubſidence of the veſſels therein; a hard contracted pulſe; a dryneſs of the mouth and fauces; the urine diminiſhed in quantity, and moſt commonly pale; a ſenſe of weight about the anus extending to the perinæum; a weakneſs of the ſtomach; a flatulency in the lower belly; a frequent deſire to make water, and to go to ſtool; with ſometimes an excluſion of a white bilious mucus; the old and weak have a *procidentia ani.*

In this caſe the blood is generally at firſt black, and very grumous, and ſometimes comes away in large clots from the varicous veſſels; afterwards it becomes red, and at laſt ſerous: ſometimes it is pituitous, or like the white of an egg. There are inſtances of voiding a pint or a quart of blood daily. It often continues long, from twenty to thirty, or even forty days.

The external or blind piles ſeldom bleed, but turn to painful varices, which being opened, weep a little, but will not yield much blood. But the internal piles, which are the off-ſpring of the ſplenic branch, and are extended to the inner ſubſtance of the rectum, and as far as the ſphincter of the anus, together with the ſmall arteries derived from the lower meſeraic, not only bleed plentifully, but when the flux is ſuppreſſed, create diſeaſes of the liver, ſpleen, pancreas, meſentery and inteſtines.

The perſons ſubject to this diſeaſe, are thoſe of a looſe, ſpungy texture, of a bulky ſize, who live high, and lead a ſedentary life, or to whom it is hereditary: ſharp purges, aloetics, high-ſeaſoned food, free drinking of ſweet wines, neglect of cuſtomary bleeding, anger, ſadneſs, hard riding, and the like, will uſher in this diſorder.

This hæmorrhage is dangerous, becauſe it decays the ſtrength, waſtes the body, and produces a ſenſe of weight in the thighs. The ſleep is laborious, and the precordia oppreſſed, there is a rumbling in

in the belly, and a weak pulſe. When it continues long, the ancles ſwell, and the countenance is ghaſtly. There is a ſtraitneſs of breathing; and laſt of all, it terminates in a cachexy, dropſy, or a ſlow and hectic fever.

If the patient is plethoric, bleed, and let his drink be cold water of the chalybeate kind; or whey turned with orange juice, or juleps, made with tincture of roſes, cooling waters, and ſyrup of roſes; likewiſe nitre, in powder, with abſorbents; and to appeaſe the ſpaſm, opiates of the mildeſt kind.

If it continues long, and the blood begins to grow ſerous, then give rhubarb with currants, and tamarinds, or which is much the ſame, with cream of tartar. Then gentle diaphoretics may be compounded of burnt hartſhorn, calx of antimony, wine-vinegar, mixt with crabs-eyes, water of elder flowers, ſimple alexitereal water, and diaſcordium, or hot decoctions of yarrow, veronica, *&c.* may be taken in bed in order to ſweat; alſo half a grain of camphor mixt with nitrous and bezoardic powders. The camphor may ſeem an inconſiderable doſe, yet its efficacy is very great in diſorders of this kind.

In the blind piles there is a moſt intenſe pain at the time of going to ſtool, and the excrements are tinged with blood: ſometimes tumours like warts lie hid under the ſphincter, or appear on the verge of the anus. Sydenham orders to take away ten ounces of blood from the arm; then to diſſolve two drams of litharge, in four ounces of ſpring water, with which mix one ſcruple of thebaic extract. Dip a hot cloth in a little of this mixture, and apply it to the part; or if the tumour is within, inject a few ſpoonfuls of it with a ſyringe; the patient muſt abſtain from fleſh, drink barley water, and take diacodium every night.

Sometimes the veins in the blind piles are ſo much dilated with blood, as to be very painful, and raiſe tubercles as large as peaſe, grapes, or eggs: they appear livid and black from the ſtagnation of a thick blood, and when preſſed with the fingers, feel like a bladder filled with liquor. Some are ſoft and indolent, others hard, inflamed, and painful, rendering the patient unable to walk, ſit, or ſtand, and produce ſuch a ſpaſm in the anus, as not to admit a clyſter: ſometimes they bleed, or turn to troubleſome itching ulcers, and occaſion an abſceſs, or a fiſtula.

According to Heiſter, linen dipt in warm ſpirit of wine, and emollients, are of infinite ſervice. Leeches may be alſo applied to exhauſt the blood; if they are not at hand, and the parts are inflamed, the lancet muſt be uſed; then dreſſings muſt be made with lint, with compreſſes, and the T bandage. The tubercles, which are full and large, may be removed by a ligature, unleſs inflamed. Sometimes they are high in the rectum, and then a ſpeculum ani muſt be uſed, in which caſe they muſt be either ſcarified with a lancet, or divided with ſciſſars, that the thick noxious blood may be diſcharged, and the pains relieved.

HÆMORRHUS, the Blood-snake, the name of a peculiar ſpecies of ſerpent; ſo called, becauſe it was ſuppoſed, that, on a perſon's being bit by it, the blood flowed out of every part of the body. It is a ſmall ſerpent, ſeldom arriving to more than a foot long; its eyes are remarkably vivid, bright, and ſparkling; its ſkin is very gloſſy, and its back variegated with a great number of black and white ſpots; its neck is very ſlender; its tail extremely ſharp; and it has a ſort of ſmall horn placed over its eyes: it is found in Egypt. There is alſo an american kind of this ſerpent found in the ſouthern parts of that continent, and called by the natives ahucyatli, which is larger than the other, and reſembles the rattle-ſnake in many particulars, but wants the diſtinguiſhing character of the rattle in the tail. See the articles Serpent and Rattle-snake.

HÆMUS, now called Rhodope, a mountain that divides Bulgaria from Thrace, or Romania, in European Turky.

HÆREDE abducto, an antient writ that lay for the lord, who having the wardſhip of his tenant while under age, could not come by his body, it being carried away by another perſon.

Hærede deliberando, *&c.* a writ directed to the ſheriff, to require one who had the ward of another, to deliver him to the perſon whoſe ward he was, on account of his land.

Hærede rapto, or raviſhment de gard. See the article Ravishment.

HÆRESY, the crime of heretics. See the article Heretic.

HÆRETICO comburendo, a writ which formerly lay againſt one convicted of hereſy

heresy by his bishop, and having abjured, afterwards fell into it again, or at least into some other, upon which he was committed into the hands of the secular power; and by virtue of this writ, upon a certificate of his conviction, he was burnt.

This writ was taken away by statute 29 Car. II. c. 9.

HAERLEM, a populous city of the United Provinces, in the province of Holland, situated near the lake which from this town is called Haerlem-Meer; four miles east of the ocean, and twelve west of Amsterdam: east long. 4° 20′, north lat. 52° 30′.

HAGAI, a canonical book of the Old Testament, so called from the prophet of that name, who, in all probability was born at Babylon, from whence he returned with Zerubbabel.

This prophet, by the command of God, exhorted the Jews, after their return from the captivity, to finish the rebuilding of the temple, which they had intermitted for fourteen years. His remonstrances had the desired effect; and to encourage them to proceed in the work, he assured them from God, that the glory of this latter house, should be greater than the glory of the former: which was accordingly fulfilled, when Christ honoured it with his presence; for, with respect to the building, this latter temple was nothing in comparison of the former.

HAG BOAT, a kind of ship. See SHIP.

HAGIASMA, or AGIASMA, among antient writers, is sometimes used for the whole church, and sometimes for the more sacred part thereof.

HAGENAU, a fortified town of Germany, in the landgraviate of Alsace: east long. 7° 40′, north lat. 48° 45′.

HAGGARD FALCON, the greenish legged falcon, with a livid back. It is a large species, equal to a full grown hen in size. See the article FALCON.

HAGIAZ, a province of Arabia, whereof Mecca is the capital.

HAGIOGRAPHA, or holy writings, a name given to a particular division of the Old Testament, as containing hymns to God, and moral precepts for the conduct of life. The books distinguished by this term were the Psalms, Proverbs, Ecclesiastes, and the Song of Solomon.

HAGIOSIDERON, in the greek church, a name given to an instrument made of iron, used by the Greeks, under the dominion of the Turks, to supply the place of bells, the use of which is prohibited. It is a plate of iron about three inches broad, and sixteen long, fastened by the middle to a chain or cord, and hung at the church door; on this they strike with an iron-hammer, with a kind of measure or cadence that is not disagreeable.

This is used to call the people to church; and it is also carried before the priest, in a procession of the sacrament to a sick person, when it is beat upon from time to time, to advertise the people to adore it, just as the romish church do with a bell.

HAGUE, a town of the United Provinces, in the province of Holland, situated two miles east of the sea, and fourteen northwest of Rotterdam. This is one of the finest towns in Europe; but tho' it enjoys all the privileges of a city of Holland, except that of sending representatives to the states, yet as it has no walls, it is only esteemed a village. Here every city of the United Provinces has a house for their respective deputies, and here the states of the province of Holland assemble, and all public affairs are transacted.

HAIL, *grando*, in physiology, an aqueous concretion, in form of white or pellucid spherules, descending out of the atmosphere.

Hail is evidently no other than drops of rain congealed into ice. This happens when in their passage thro' the inferior air, they meet with nitrous particles, which are known to contribute greatly to freezing. Their magnitude is owing to a fresh accession of matter as they pass along. Hence we see the reason why hail is so frequent in summer, because at that time greater quantities of nitre are exhaled from the earth, and float up and down the air. See the articles RAIN and FROST.

HAILBRON, a city of Germany, in the circle of Swabia, and dutchy of Wirtemberg: east long. 9° north lat. 49° 10′.

HAINAN, or AYNAN, an island of an oval form, and about 300 miles in circumference, about fifty miles south of the continent of China, and subject to that emperor. It is situated between 107 and 110° of east long. and between 18 and 20° of north latitude.

HAINAULT. See HAYNAULT.

HAINBURG, a town of Germany, in the circle and archdutchy of Austria, situated on the Danube, thirty five miles east

of Vienna: east long. 17° 8′ north lat. 48° 20′.

HAINES, a river of the Austrian Netherlands, which runs from east to west thro' the province of Hainault, and falls into the Scheld at Conde.

HAIR, in physiology, slender, oblong, and flexible filaments, growing out of the pores of animals, and serving most of them as a covering.

When these filaments, in human subjects, grow on the body, they are denominated pili; when on the head, capilli. These last are most proper for examination: that part of them, which is without the skin, appears cylindric to the naked eye; but, when examined by the help of glasses, it is found to be unequal and irregular, and often knotty. It is pellucid, but is not hollow; but the extremities of them are often split into several parts, so as to resemble a pencil. The part of the hair that is within the skin, is called the root of it; and, from its roundish figure, the bulb. This part is hollow and vasculous, in the manner of the bases of the young feathers on birds: this vasculous part is inclosed in a follicle, or case, and is most conveniently to be examined in the large hairs of a cat's whiskers, or in the beards of other animals.

The origin of the hair is in the cutis, and in the fat that lies underneath it; and probably from nerves, as an acute pain is felt in pulling them off. The nutritious matter of the hair is probably the same with that of the other parts of the body; not merely excrementitious, as the old authors have supposed. It is a common assertion, that the hair grows after a person is dead; but unquestionable experiments prove this to be of the number of vulgar errors, not at all the more true for being universally received as truth.

The colour of the hair is very different in different people of the same country; but there are also general differences of it, peculiar in a manner, to the climates. In the hottest countries it is very black; in the colder, it is yellowish, redish, or brown; but in all places it grows grey or white with age; and in the labourers in copper mines, and others, who are continually receiving the effluvia of that metal it becomes greenish. The length of the hair is, in the individual, very different. It is always much longer on the head than elsewhere. In general it is short and curled under the torrid zone, and gradually longer in the more temperate climates. Its consistence to the touch, also, varies greatly, 1. In regard to the different climates and subjects. In general, it is harsher in the Æthiopian than in the European; and harder and dryer in adults than in infants, whose habit abounds more with humidities. 2. In regard to the parts of the body on which it grows: it is very harsh and hard under the arm-pits, and about the pudenda: on the head it is much softer; and on all the other parts of the body it is greatly softer than there, and very short.

As to the time of the origination of the hair, that of some parts of the body is of the same date with the parts it grows on; such is that of the head, the eyelashes, and eye brows: That of others begins to grow only at a certain time; such is that of the beard, of the armpits, and of the pudenda; and in the same manner some of the hair continues always increasing in length, while other parts of it never grow after the birth of the infant.

The use of the hair of the head is to keep that part warm, as well as to be an ornament to it: that of the rest of the hair, except only that of the eye-brows and eye-lashes, is not so easily determined.

Human-HAIR, in commerce, makes a considerable article of trade, the goodness of which consists in its being neither too coarse, nor too slender.

Hair that does not curl or buckle naturally, is made to do so by first boiling, and then baking it. Having sorted it, they next roll it carefully upon pipes, hollowed in the middle; these they put into a pot or cauldron, and let them boil about two hours; then taking them out, they are dried and coverd with papers; and, lastly, sent to the pastry-cook, who bakes them in an oven, till the crust with which they are covered is about three fourths baked.

The hair of several other animals, as the beaver, hare, coney, &c. is also used in commerce, and especially in the manufacture of hats. See the article HAT.

As to the duties upon hair, that of camels pays, upon importation $6\frac{93}{100}$d. each pound; and draws back, upon exporta-

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portation, $6\frac{72\frac{1}{2}}{100}$d. Cow or ox-hair, pays 7 s. $2\frac{17\frac{1}{2}}{100}$d. the 112 pounds; and draws back, upon exportation, 6 s. $5\frac{62\frac{1}{2}}{100}$d. Elks-hair for ſaddles, the hundred weight, pays 2 s. $4\frac{87\frac{1}{2}}{100}$d. and draws back, upon exportation, 2 s. $1\frac{31\frac{1}{4}}{100}$d. Ordinary goats-hair pays $4\frac{57}{100}$d. the pound; and draws back, upon exportation, $4\frac{23\frac{3}{4}}{100}$d. Goats-hair, otherwiſe called carmenia-wool, pays $6\frac{44\frac{1}{2}}{100}$d. the pound; and draws back, upon exportation, $6\frac{11\frac{1}{4}}{100}$d. Horſe-hair pays $7\frac{18\frac{1}{8}}{100}$d. the pound; and draws back, upon exportation, $6\frac{46\frac{7}{8}}{100}$d. Human hair for perukes, pays 1 s. $7\frac{15}{100}$d. the pound; and draws back, upon exportation, 1 s. $5\frac{25}{100}$d.

Hair, among farriers, is generally called the coat; and, with regard to horſes, deſerves particular conſideration.

The hair growing on the fetlock, ſerves as a defence to the prominent part of it, in travelling in ſtony ways, or in froſty weather: if the hair of a horſe's neck, and the parts moſt uncovered, be cloſe, ſmooth and ſleek, it is an indication of his being in health and good caſe. In order to make the hair of an horſe ſoft and ſleek, he muſt be kept warm at heart, for the leaſt inward cold will cauſe the hair to ſtare; alſo ſweat him often, for that will looſen, and raiſe the duſt and filth that renders his coat foul; and when he is in the heat of a ſweat, ſcrape off all the white foam, ſweat and filth that is raiſed up, with an old ſword blade; and alſo when he is blooded, if you rub him all over with his own blood, repeating it two or three days, and curry and dreſs him well, it will make his coat ſhine as covered with a fine varniſh.

Hair falling from the main or tail, is cauſed either by his having taken ſome heat, which has engendered a dry mange; or from ſome ſurfeit which cauſes the evil humours to reſort to thoſe parts. To cure this, anoint the horſe's mane and creſt with back ſoap; make a ſtrong lee of aſhes, and waſh it all over with it. But if a canker ſhould grow on a horſe's tail, which will eat away both fleſh and bone; then put ſome oil of vitriol to it, and it will conſume it: and if you find that the vitriol corrodes too much, you need only to wet it with cold water, and it will put a ſtop to it.

If you would take away hair from any part of a horſe's body; boil half a pound of lime in a quart of water, till a fourth part is conſumed, to which add an ounce of orpiment; make this into a plaſter, and lay it on.

Hair'sbreadth, a meaſure of length, being the forty-eighth part of an inch.

HAKE, in ichthyology, the engliſh name of the gadus, with two fins on the back, and the under jaw longeſt. It grows to two feet or more in length, but is the ſlendereſt of all the gadi. See Gadus.

HALABAS, a city of the hither India, and capital of the province of Halabas, ſituated at the conflux of the rivers Ganges and Jemma: eaſt long. 83° north at 26° 35′.

HALBARD, or Halbert, in the art of war, a well-known weapon, carried by the ſerjeants of foot and dragoons.

It is a ſort of ſpear, the ſhaft of which is about five feet long, and made of aſh, or other wood. Its head is armed with a ſteel point, edged on both ſides, not unlike the point of a two-edged ſword. But beſides this ſharp point, which is in a line with the ſhaft, there is a croſs piece of ſteel, flat and pointed at both ends; but generally with a cutting edge at one extremity, and a bent ſharp point at the other; ſo that it ſerves equally to cut down, or puſh withal. It is alſo uſeful in determining the ground betwixt the ranks, and in adjuſting the files of a battalion.

HALBERSTAT, a city of Germany, in the circle of Upper Saxony, the capital of the dutchy of the ſame name; ſubject to the king of Pruſſia, eaſt long. 11° 6′, north lat. 51° 55′.

HALBERT, among farriers, is a ſmall piece of iron an inch broad, and three or four inches long, ſoldered to the toe of a horſe's ſhoe, to hinder a lame horſe from trading on his toe.

Theſe halbert ſhoes neceſſarily conſtrain a lame horſe, when he goes at a moderate pace, to tread or reſt on his heel, which lengthens and draws out the back ſinew, that was before in ſome meaſure ſhrunk.

HALCRYPTIUM, a name given by Dr.

Hill, to the salt suspended in a fluid form, and in very small quantities in mineral waters, scarce discernible by the taste, and with much difficulty separable from them; but, by proper management, may be procured in form of a dry powder; which, being carefully prepared by solution and evaporation, affords extremely minute, oblong, quadrangular crystals. The halcryptium, thus obtained, has all the properties of the common alkaline salts. See the article ALKALI.

All the chalybeate waters afford it; but none in such large quantities as that of Pyrmont. See the article PYRMONT.

HALCYON, in ornithology, a name given by the antients to the ispida, or king-fisher. See the article KING-FISHER.

HALCYON DAYS, *dies halcyonii*, in antiquity, a name given to seven days before and as many after the winter-solstice; by reason the halcyon, invited by the calmness of the weather, laid its eggs in nests built on the rocks, close by the brink of the sea, at this season.

HALE, in the sea language, signifies pull; as to hale up is to pull up; to hale in or out, is to pull in or out. To over-hale a rope, is to hale it too stiff, or to hale it the contrary way.

HALEM, a town of the Austrian Netherlands, in the province of Brabant, twenty-five miles west of Maestricht: east long. 5° 5′, north lat. 51° 5′.

HALESWORTH, a market-town of Suffolk, thirty-five miles east of Bury: east long. 1° 40′, north lat. 52° 30′.

HALF-BLOOD, in law, is where a man marries a second wife, the first being dead, and by the first venter has a son, and by his second venter has likewise a son, the two brothers in this case are but of half-blood; they being issue by different venters; and on that account, lands in fee cannot descend from the one to the other; except in case of crown lands, dignities, or estates tail. But half-blood is no impediment to an administration, which may be granted to that as well as to the whole blood, of the effects of an intestate; and the half-blood shall come in for a share of his personal estate, equally with the whole blood, as the brothers by different venters are next of kin in equal degree. 22 Car. II. c. 10.

HALF-MARK, a noble or 6 s. 8 d.

HALF-MOON, in fortification, an out-work composed of two faces, forming a saliant angle, whose gorge is in form of a crescent, or half-moon; whence the name. We owe the invention of half-moons to the Dutch, who placed them before the points of bastions, which are now much better defended by counter guards; the half-moons being placed before the curtins, which they defend to admiration. There are two sorts of half-moons, one with, and the other without flanks. Those without flanks, which are most common, may be thus constructed: From F, (plate CXXV. fig. 1.) the angle of the flank, describe an arch, M A, with the radius F M, four or five toises longer than the part of the line of defence E F. The point A, where this arch intersects the line C A, which divides the curtin in two equal parts, shall be the flanked angle of the half-moon; then the points, *h*, *h*, where the line of the counterscarpe intersects the line A M, will determine the length of its faces, A *h*, A *h*. Those with flanks are constructed much in the same manner; only that D *h*, from four to ten toises, is cut off of each demigorge, and the flanks D G, E F, are raised perpendicular to the curtin.

HALF-SEAL, that used in the court of chancery, for sealing commissions to delegates, upon any appeal, in ecclesiastical or marine causes.

HALF-TANGENTS. See the articles TANGENT and SCALE.

HALF TONGUE, *medietas linguæ*, among lawyers. See the article MEDIETAS.

HALI, HALY, or *powder of* HALI. See the article POWDER.

HALIÆTUS, in orinthology, a name used by some for the bald buzzard. It is of the size of a large cock, and its head is white, whence it has got the epithet bald, because at a distance it appears as if there were no feathers on it.

HALIFAX, the capital town of Nova Scotia in North America, situated in 64° west long. and 45° north lat.

This is also the name of a large market town of Yorkshire, 34 miles south-west of York: west long. 1° 40′, north lat. 53° 45′.

HALIOTIS, the EAR-SHELL, in conchyliology, a simple shell without any hinge, and formed all of one piece, of a depressed figure, very patent at the mouth, having an approach to the spiral form at the summit, and having several perforations on the lateral part of the disk. It has got the name ear-shell from its figure. See EAR and AURIS.

HALL,

HALL, in architecture, a large room at the entrance of a fine house and palace. Vitruvius mentions three kinds of halls; the tetrastyle, with four columns, supporting the platfond, or ceiling; the corinthian, with columns all round let into the wall, and vaulted over; and the egyptian, which had a peristyle of insolated corinthian columns, bearing a second order with a ceiling.

The hall is properly the finest as well as first member of an apartment; and in the houses of ministers of state, magistrates, &c. is the place where they dispatch business, and give audience. In very magnificent buildings, where the hall is larger and loftier than ordinary, and placed in the middle of the house, it is called a saloon. See APARTMENT.

HALL, in old writers, is also used for a mansion-house; and to this day, in many parts of the kingdom, gentlemen's seats are called halls.

HALL is also a public building, or court of justice, as Westminster-hall, Guild-hall, a company's hall, &c.

In Westminster-hall are held the courts of King's bench, Common-pleas, Chancery, and Exchequer. See the articles KING'S BENCH, COMMON-PLEAS, &c.

HALL, in geography, a town of Germany, in the circle of Austria, and county of Tyrol, situated six miles north-east of Inspruck: east long. 11° 28′ north lat. 47° 15′.

HALL is also a town of the Austrian Netherlands in the province of Brabant, seven miles south of Brussels: east long. 4° 10′, north lat. 50° 50′.

HALL is also a city of Germany, in the circle of Upper Saxony, the capital of a dutchy situated on the river Sala, subject to the king of Prussia: east long. 12° 5′ north lat. 51° 35′.

HALL is also a town of Germany, in the circle of Swabia, twenty miles east of Hailbron; being an imperial city, or sovereign state: east long. 9° 45′, north lat. 49° 20′.

HALLAGE, a fee or toll paid for cloth brought to be sold in Blackwell hall, London.

HALLAMAS, the same with all-saints. See the article ALL-SAINTS.

HALLATON, a market town, ten miles south-east of Leicester.

HALLAND, a subdivision of Gothland, in Sweden, at the entrance of the Baltic.

HALLEIN, a town of Bavaria, eight miles south of Saltzburg.

HALLELUJA, a word signifying, praise the Lord.

The singing halleluja was a sort of invitatory, or call to each other, to praise the Lord.

St. Austin says, that in some churches, it was sung only on Easter-day, and the fifty days of Pentecost; but that even in those churches where it was most in use, it was never used in the time of Lent. The fourth council of Toledo forbids the singing it, not only during Lent, but on all other days of fasting; and by the same council it is appointed to be sung after the reading of the gospel. It was also sung at funerals, as St Jerom informs us in his epitaph of Fabiola, where he speaks of the whole multitude singing psalms together, and making the golden roof of the church shake with echoing hallelujas.

HALLEN, a town of the Austrian Netherlands, in the province of Brabant: east long. 5°, north lat. 50° 55′.

HALLEIN, a town of Germany, in the archbishopric of Saltzburg: east long. 13° 6′, north lat. 47° 36′.

HALLER, a town in the Netherlands, in the province of Brabant: east long. 5°, north lat. 50° 40′.

HALLERIA, in botany, a genus of the didynamia-angiospermia class of plants, the flower of which is monopetalous and ringent, with a quadrifid limb: the fruit is a berry, containing two cells, with a solitary seed.

HALMSTAT, a port town of Gothland in Sweden, eighty miles south of Gottenberg: east longitude 13° 5′, north lat. 56° 45′.

HALO, in physiology, a meteor in the form of a luminous ring or circle, of various colours, appearing round the bodies of the sun, moon, or stars. See the articles COLOUR, SUN, &c.

Concerning the production of halos, Sir Isaac Newton intimates, that they are formed by the light which comes through the drops of rain, by two refractions, *viz.* at N and F (plate CXXV. fig. 2. n° 1.) without any reflection; but how this may be, is not easy to conceive.

A rainbow, or deeply coloured ring, as will be shewn under rainbow, might have been expected at the distance of about thirty-eight degrees from the sun; and also why it cannot happen. See the article RAINBOW.

For the same reason we should also not expect an halo to be formed by the same refracted

refracted rays, *viz.* on account of their not being refracted parallel to the eye, and consequently not entering it dense enough to render that part of the heaven more luminous than the rest; or to produce the lucid ring we call by this name. Again, Sir Isaac says, it ought to appear strongest at the distance of about twenty-six degrees from the sun, *viz.* when the angle I M G = 26°, and to decay gradually both ways. But though that philosopher did not undoubtedly assert any thing without very great reason, yet this does not appear to us. For that the angle I M G may be twenty-six degrees, the angle of incidence B C N must be about forty-six; and then the angle of refraction C N F will be near thirty-three degrees: but why such an incidence and refraction should cause the rays to be refracted in greater plenty to the eye than any other, does not appear to me, says Martin, nor can I find it by any experiment. On the contrary, as the angle I M G increases with the angle of incidence, and consequently with the angle of refraction, it is evident that with respect to heterogeneal light, the greater the angle I M G is, the more will it be refracted and scattered; and consequently the farther the drops are situated from the sun, the less dense will be the light transmitted by refraction to the eye, which therefore ought to decrease, as the distance of the sun increases. See the article REFRACTION.

As Sir Isaac Newton has said but little, so his expositors Dr. 'S Gravesande and Dr. Pemberton have thought fit to be absolutely silent on this head. Mr. Huygens has advanced an hypothesis by which the phænomenon may be solved, if we grant him the following postulatum, *viz.* That there are certain globules in the atmosphere, consisting of a coat or shell of transparent ice or water, containing an opake nucleus or kernel within; and that these are made from particles of snow, which is in itself opake, attracting the aqueous particles in the vapour or exhalation by which it is sustained, which gathering together, form the semipellucid shell of water, or are frozen into a crystalline shell of ice; and this, he thinks, is proved to be matter of fact by the hailstones which fall to the earth: for these, says he, when broken, discover some snow at the center.

These things premised, he addresses himself to the solution, as follows. Let A B C D (*ibid.* n° 2.) represent such a globule with the opake nucleus E F in the middle of it; and let us suppose the rays coming from G, H, to fall on the side A D. It is manifest they will be refracted inwards from the surface A D; from whence it follows that a great number of them must strike upon the kernel E F. Let G A, and H D, be the rays which, after refraction, touch the sides of the kernel E F, and let them be refracted again at B and C, emerging in the lines B K, and C K, crossing each other in the point K, whose distance from the globule is somewhat less than its semidiameter. Wherefore, if B K and D K be produced towards M and L, it follows that no light coming from the sun through the globule, can proceed to the eye any where placed within the angle L K M, or rather in the cone which that represents; supposing that the obliquity of the incident rays H D and G A is such as shall make the arch Q C, and Q B, the greatest possible: for then all the rays exterior to H D and G A, will be refracted nearer to Q, and after emergence cross each other in a point *k*, nearer the globule than the former; and therefore cannot come at the eye placed within the said cone L K M. Suppose now the eye placed at N, (*ibid*, n° 3.) and let N R, N Q, be drawn parallel to L K, and M K; then it is plain none of the globules, the same as A B C D, within the cone R N Q, can come to the eye at N. Thus the globules at O and P have their refracted rays *a k b* and *c k d*, including the eye in the cone of obscurity. But other globules which lie without the cone Q N R, as S and T do not involve the eye N by their shadow-cones *l k c*, and *f k m*; and therefore some of those rays which are more refracted than *k c*, or *k f*, will fall upon the eye, and produce a luminous circular ring or corona, including a dark area within, and whose light outwardly decreases as it is more remote from the center.

HALSFANG, or HEALSFANG, in old writers, the same with pillory. See the article PILLORY.

Sometimes it signifies a mulct, paid to be exempted from that punishment.

HALSTEAD, a market-town of Essex, sixteen miles north of Chelmsford.

HALTER, in the manege, a headstall of hungary leather, mounted with one and sometimes two straps, with a second throat-band, if the horse is apt to unhalter himself.

HALTER CAST, among farriers, an excoriation

riation of the paftern occafioned by a horfe's endeavouring to fcrub the itching part of his body near the head and neck, when one of his hinder feet entangling in the halter, he fometimes receives very dangerous hurts in the hollow of his paftern by his ftruggling to difengage himfelf.

For the cure of this take linfeed-oil and brandy, of each an equal quantity; fhake them together in a bottle till they are well mixt, and anoint the place morning and evening; having firft clipt away the hair; but take care to keep the foot very clean.

HALTERISTS, *halteriftæ*, in antiquity, a fort of players of difcus, fo called from the greek ἁλτηρ; which is fuppofed to have been a leaden weight or ball, carried in each hand with a view to poife their bodies.

HALTING, among farriers, a limping or going lame, an irregularity in the motion of an horfe, arifing from a lamenefs in the fhoulder, leg, or foot, which makes him fpare the part, or ufe it timoroufly. Halting happens fometimes before, and fometimes behind; if it be before, the ailment muft neceffarily be either in the fhoulder, knee, flank, paftern, or foot. If it be in the fhoulder, it muft be towards the withers, or in the pitch of the fhoulder; and it may be known by his drawing one of his legs after him, and not ufing it fo nimbly as the other. If he caft it more outward than the other, it is a fign of lamenefs, and that the grief lies in the fhoulder; and if you turn him fhort, on either hand, you will find that he will either favour that leg, or trip in turning. His lamenefs may alfo be feen by his ftanding in the ftable, where he will hold the fame leg more out than the other. If when you are upon his back, he complains more than he ufually does, the grief certainly lies in the withers; fo that on griping him hard, you will perceive him to fhrink, or perhaps offer to bite. If he treads thick and fhort before, then the grief is upon the pitch of the fhoulder, clofe to the breaft, which may be difcovered by preffing the thumb hard againft the place, on which he will fhrink, and put back his leg, foot, and body. If the grief be in the elbow, it may be known by pinching him with the fore-fingers and the thumb, and then he will hold up his leg and offer to bite; but if the grief be in the knee, it may be difcovered by the ftiffnefs of his going; for he will not bend it fo nimbly as he does the other. If it be in the flank or fhin-bone, the fame may be feen or felt, it being a back finew, fplenter, ftrain, or the like. If it be in the bend of the knee, it is a malander, which is alfo eafily difcovered. Further, when the paftern or joint is affected, it may be known by his not bending it fo well as the other, and by its being very hot. If it be in the foot, it muft be either in the coronet or fole; if in the coronet, it probably came by fome ftrain or wrench: if in the hoof, by fome over-reach or diftemper in or about the frufh: if in the fole, from fome prick, accloy, nail, &c.

HALTWESEL, a market-town of Northumberland, thirty-two miles weft of Newcaftle: weft long. 2°, north lat. 55°.

HALYMOTE, in old law-books, fignifies a holy or ecclefiaftical court. See the article COURT.

HALYWERCFOLK, in old writers, were perfons who enjoyed land, by the pious fervice of repairing fome church, or defending a fepulchre.

This word alfo fignified fuch perfons in the diocefe of Durham, as held their lands to defend the corps of St. Cuthbert, who from thence claimed the privilege of not being forced to go out of the bifhopric.

HAM, in anatomy, the part behind the knee. See KNEE and LEG.

HAM, in old writers, a Saxon word ufed for a home or dwelling-place, for a borough and a village, and alfo for a little narrow flip of meadow.

HAM, in geography, a city of Germany, in the circle of Weftphalia, and the capital of the county of Mark, fubject to Pruffia: eaft long. 7° 15′, north lat. 51° 35′.

HAM, in cookery, the leg and thigh of a hog feafoned and dried.

To falt a ham in imitation of thofe of Weftphalia: let the ham be of young pork, fprinkle it with falt for one day, that it may fetch out the blood; then wipe it dry, and rub it with the following mixture: take a pound of brown fugar, a quarter of a pound of faltpetre, half a pint of bay-falt, and three pints of common falt; ftir thefe together in an iron pan over the fire, till they are pretty hot, and then rub the leg of pork with it; let it lie three weeks in this falting, frequently turning it, and then dry it in a chimney.

HAMADAN, a city of Perfia, in the province of Eyrac-Agem, 200 miles north-

weft

weſt of Iſpahan: eaſt long. 47° 35′, north lat. 35°.

HAMADRYADS, in heathen theology, certain rural deities; being nymphs of the woods, whoſe fate depended on certain trees, together with which they were ſuppoſed both to be born and to die.

It was principally with oaks that theſe deities were thus united; and theſe nymphs were ſuppoſed to ſhew extraordinary gratitude to thoſe who preſerved them from death. As for thoſe who deſtroyed the trees on which their life depended, they were ſure to be puniſhed for it in an exemplary manner.

It was eaſy for the gentiles to fall into the opinion of theſe ſort of divinities; for as they entertained a kind of religious veneration for ſuch trees as were very old, and of an uncommon ſize, it was an eaſy tranſition to the belief, that they were the abode and reſidence of ſome deity.

HAMAMELIS, in botany, a genus of the tetrandria-digynia claſs of plants, the corolla of which conſiſts of four linear, equal, and very long petals: the fruit is a bivalve capſule, containing two cells: the ſeed is a ſingle nucleus, of an oblong oval figure, and ſmooth ſurface.

HAMAXOBIANS, *hamaxobii*, an antient people of european Sarmatia, ſo called from their living together in chariots or waggons, for the conveniency of ſhifting the place of their abode at pleaſure.

HAMBLING, or HAMELLING, in the foreſt-law, is the ham-ſtringing of dogs, or cutting the great tendon called the ham ſtring.

HAMBURGH, a large city and well fortified port-town of Germany, in the circle of lower Saxony, and dutchy of Holſtein, ſituated on the north-ſide of the river Elbe, partly on iſlands, and partly on the continent. It is an imperial city, or ſovereign ſtate, governed by its own magiſtrates, and ſubject only to the general laws of the empire. Merchants from all parts of Europe reſort to it, from whence their goods are ſent into the heart of the empire: eaſt long. 9° 40′, north lat. 54′.

HAMBURGH COMPANY *of merchants.* See the article COMPANY.

HAMCHEU, the capital of the province of Chekiam, in China, ſituated on the river Cienton, 160 miles ſouth-eaſt of Nanking: eaſt long. 120°, north lat 30°.

HAMELIN, a town of Germany, in the circle of lower Saxony, and dutchy of Brunſwic, ſubject to the elector of Hanover: eaſt long. 9° 12′, north lat. 52° 15′.

HAMILTON, a town of Scotland, in the county of Clydſdale, ſituated on the river Clyde, eleven miles ſouth-eaſt of Glaſgow: weſt long. 3° 50′, north lat. 55° 40′.

HAMLE, the name of the eleventh month of the ethiopian year, beginning on the 25th of June, old ſtyle.

HAMLET, HAMEL, or HAMPSEL, is a ſmall village, or part of a pariſh.

HAMMER, a well known tool uſed by mechanics, conſiſting of an iron-head, fixed croſs-wiſe upon a handle of wood. There are ſeveral ſorts of hammers uſed by black-ſmiths; as, 1. The hand-hammer, which is of ſuch weight that it may be weilded or governed with one hand at the anvil. 2. The up-hand ſledge, uſed with both hands, and ſeldom lifted above the head. 3. The about-ſledge, which is the biggeſt hammer of all, and held by both hands at the fartheſt end of the handle, and being ſwung at arms-length over the head, is made to fall upon the work with as heavy a blow as poſſible. There is alſo another hammer uſed by ſmiths, called a rivetting-hammer, which is the ſmalleſt of all, and is ſeldom uſed at the forge, unleſs upon ſmall work. See Plate of Smithery.

Carpenters and joiners have likewiſe hammers accommodated to their ſeveral purpoſes. See Plate of Joinery.

HAMMER, *malleus*, in anatomy. See the articles EAR and MALLEUS.

HAMMER *of a clock.* See CLOCK.

Yellow-HAMMER, in ornithology. See YELLOW-HAMMER.

HAMMER HEADED SHARK, in ichthyology, the ſame with the zygæna. See the article ZYGÆNA.

Coining with the HAMMER. See the article COINING.

HAMMOCK, in a ſhip, a piece of canvas hung up faſt by the four corners between decks, for ſeamen to ſleep in.

HAMMON, or AMMON, in antiquity, a name given to Jupiter in Lybia, where was a celebrated temple of that deity. See AMMON.

HAMMONT, a town of Germany, in the circle of Weſtphalia, and biſhopric of Liege, ſituated near the confines of Brabant: eaſt long. 5° 32′, north lat. 51° 20′.

HAMPER, or HANPER, in chancery. See the article HANPER.

HAMPSHIRE, an engliſh county, bounded by Berkſhire, on the north; by Surrey and

and Suffex, on the eaft; by the englifh channel, on the fouth; and by Wiltfhire and Dorfetfhire, on the weft. It comprehends the ifle of Wight. Its chief towns are Winchefter, Southampton, and Portfmouth.

New HAMPSHIRE, a province of New England, in north America, bounded by Nova Scotia, on the north; by the Atlantic ocean, on the eaft; by the province of Maffachufets-bay, on the fouth; and by New York, on the weft: fubject to Great Britain.

HAMSTEAD, a pleafant village in Middlefex, four miles north of London.

HAMSOKEN, in old law books, fignifies the liberty or privilege a man enjoys in his own houfe. It is alfo faid to fignify a franchife granted to lords of manors, by which they hold pleas, and take cognifance of the breach of that immunity. In Scotland it is ufed for the crime of him that violently, and contrary to the peace, affaults a perfon in his own houfe.

HAMPTON, a market town of Gloucefterfhire, twelve miles fouth of Gloucefter: weft long. 2° 15′, north lat. 51° 38′.

HAMPTON, is alfo a port town of New Hampfhire, forty miles north of Bofton: weft long. 70°, north lat. 42° 35′.

HAMPTON-COURT, a town in Middlefex, fituated on the north fide of the Thames, twelve miles weft of London, and two weft of Kingfton; in which is the fineft palace belonging to the king of England.

HANAPER, or HANPER, in chancery. See the article HANPER.

HANAU, the capital of a county of the fame name in Germany, is pleafantly fituated on the river Kunts, thirteen miles eaft of Francfort, and twelve north-weft of Afchaffenburgh: eaft long. 8° 45′, north lat. 50° 12′.

HANCES, in a fhip, are falls or defcents of the fife rails, which are placed from the ftern down to the gang-ways.

HAND, *manus* in anatomy, the extreme part of the arm. See the article ARM.

The bones of the hand are thofe of the carpus, metacarpus, and fingers, with the offa fefamoidea. See CARPUS, &c.

The gibbous or convex part of the two firft of thefe bones, conftitutes the back of the hand; and the hollow part, the palm. Their bodies are placed diftant from each other, and the interftices between them are filled up with the mufcles called mufculi interoffei, ferving to move the fingers.

As for the mufcles of the hands, fee FINGER, WRIST, METACARPUS, &c.

The mechanifm of the hand, is admirably contrived to anfwer the manifold ufes and occafions wherein it is employed, being made up not only of nerves, mufcles, &c. but a great number of little bones, all curioufly jointed into each other; whence its extraordinary flexibility, which enables it to lay hold of adjacent bodies.

Luxation of the HAND, in furgery. The hand is faid to be luxated forwards, or inwards, when it recedes from the mufcles that bend the fingers; the luxation is faid to be backward, when it departs from the mufcles which extend the fingers; and when the carpus makes a tumour near the thumb, and a cavity near the little finger, the luxation is faid to be outward.

To reduce luxations of the hand, it muft be fufficiently extended by two affiftants; one of whom is to lay hold of the hand, and the other of the humerus, pulling in oppofite directions; then the part of the hand where the finus is, muft be placed on a flat table, that whatever fticks out may be depreffed by the furgeon, and the hand reduced into its natural ftate.

HAND, in the manege, a meafure of four inches, or of a clinched fift, by which the height of a horfe is computed. Thus, a horfe of war fhould be fixteen hands high.

Hand is alfo ufed for the divifion of a horfe, into the fore and hind parts. The parts of the fore-hand, are the head, neck, and fore-quarters; and thofe of the hind-hand, include all the other parts of his body.

Hand is alfo ufed for the horfeman's hand. Thus fpear-hand, or fword-hand, is the horfeman's right-hand; and bridle-hand, is his left-hand. And as the bridle hand gives motion to the bit, and ferves to guide the horfe more than the other helps, there are feveral expreffions which relate to it. As, this horfeman has no hand, that is, he makes ufe of the bridle unfeafonably, and does not know how to give the helps of the hand with due nicety. To keep a horfe upon the hand, is to feel him in the ftay upon the hand, and to be prepared to avoid any furprifal or difappointment from the horfe. A horfe is faid to lie or to reft upon the hand, that never refufes, but always obeys the hand. A good horfe-

man ought to have a light hand; that is, he ought to feel the horfe upon his hand, only that he may refift him when he attempts to flip from it; and inftead of cleaving to the bridle, he fhould lower it, as foon as he has made his refiftance: thus if a horfe, through his eagernefs to go forward, preffes too much upon the hand, the rider ought, at certain times, to flack his hand, and at other times to keep a hard hand, that he may difappoint the horfe, and prevent his preffing continually upon the bit; and this facility of flackening and ftiffening the hand, is what is called a good hand. A horfe is faid to force the hand, when he does not fear the bridle, but runs away in fpite of the horfeman. To make a horfe part from the hand, or to fuffer him to flip from the hand, is to put on at full fpeed. To work a horfe upon the hand, is to manage him by the effects of the bridle, without any other helps, except, upon occafion, thofe of the calves of the legs.

To make a horfe right upon the hand, and free in the ftay, he muft be taught, by degrees, and by gentle methods, to know the hand; the horfeman muft turn him, or change hands, ftop him, or manage with dexterity the preffure of his mouth, fo as to make him fuffer chearfully and freely the effect of the bit, without refifting or refting heavy upon the hand.

HAND-BARROW, a weel-barrow, which is in great ufe in fortification, for carrying earth from one place to another, and in a fiege, for carrying bombs or cannon-balls along the trenches.

HAND-BOROW, in law-books, a furety, or manual pledge, of an inferior rank; as head-borow fignifies a chief or fuperior.

HAND-BREADTH, a meafure of three inches.

HAND-CUFFS, an inftrument formed of two circular pieces of iron, each fixed on a hinge on the ends of a very fhort iron bar, which being locked over the wrifts of a malefactor, prevents his ufing his hands.

HAND-HABEND, in law-books, a thief caught with the ftolen goods about him.

HAND-HOOK, an inftrument ufed by fmiths to twift fquare iron.

HAND SCREW, an inftrument more ufually called a jack. See the article JACK.

HAND SPIKES, wooden levers ufed at fea to traverfe the ordnance, or to turn the windlafs in weighing up the anchor, *&c.* They are more commodious than iron crows, becaufe their length allows a better poize.

Harmonical HAND, in mufic, a name given to the antient diagram. See DIAGRAM. The reafon of this appellation was, that Guido Aretine, upon inventing the notes *ut, re, mi, fa, fol, la,* difpofed them on fingers, of the figure of a hand ftretched out. See the article NOTE.

He thus changed the letters of the alphabet, which till that time ufed to exprefs the notes for thefe fix fyllables, taken out of the firft ftrophe of the hymn of St. John the baptift, compofed by Paulus Dioconus.

Ut *queant laxis* re-*fonare fibris*
Mi-*ra geftorum* fa-*muli tuorum,*
Sol-*ve polluti* la-*bii reatum,*
Sancte Johannes.

Impofition of HANDS, the ceremony of laying the hands on the head of a perfon to be ordained. See ORDINATION.

HANDS, in heraldry, are borne in coat-armour dexter and finifter, that is, right and left, expanded or open. Thefe are the moft neceffary parts of the human body, as they ferve to exprefs all forts of actions, and even our very thoughts and defigns; thus joining of hands is an univerfal token of friendfhip, and clapping of hands a general mark of applaufe.

HANDLING, among cock-fighters, fignifies the meafuring the girth of a cock's body, by the hands.

HANGINGS, the linings of rooms, whether made of paper, arras, or the like.

HANKWITE, or HANGWITE, a fine impofed for hanging a felon or thief, without due courfe of law, or for fuffering him to efcape out of legal cuftody. Thus to be quit of hangwite, denotes a freedom from the penalty above-mentioned.

HANOVER, a city of Germany, in the circle of Lower Saxony, and dukedom of Brunfwic, fituated on the river Leina, thirty-fix miles weft of Brunfwic: it is the capital of his britannic majefty's german dominions, fituated in eaft long. 9° 45′, north lat. 52° 32′.

HANPER, HANAPER, or HAMPER, an office of the chancery, anfwering to the fifcus of the Romans.

Clerk of the HANPER, or HAMPER. See the article CLERK.

HANSE, or HANS, a company of merchants united for the promotion and advantage of trade.

HANSE-TOWNS, port-towns of Germany, of which Lubec and Hamburgh were the

the chief. They were formerly all of them imperial cities, confederated for their mutual defence, and the protection of their trade.

HAP, in a legal sense, signifies to catch the rent, where partition is made between two parceners, and more land is allowed to one than the other, and she who has most of the land charges it to the other, who haps the rent, *&c.*

HAPPINESS, among philosophers, consists in the enjoyment not only of the goods of the body, as health, strength, neatness, decency, *&c.* but also of the more refined goods of the mind, as knowlege, memory, taste, and especially the moral virtues, magnanimity, fortitude, benevolence, *&c.*

Human happiness, in the present state of things, consists of many separate and little rivulets, which must often be left dry in the perpetual flux and reflux of human affairs; yet the main stream, with which these lesser ones generally communicate, flows from within, from the heart of man; and, if this be found and clear, happiness will roll on though life with a strong and equal current. Many of the inferior goods that enter the account of happiness, as health, fame, fortune, and the like, are often even after our utmost care unattainable, or at least precarious; it is therefore of the utmost consequence to be prepared against the want or loss of them, by having our desires moderated, and our passions under due command. And, let it be remembered, that it is not only of great importance to our ease and security against ill, but one of the highest improvements of virtue, to contemn what is thus unattainable and precarious, to contemn those things the contempt of which is truly great and heroic, and to place our happiness chiefly in those virtuous exercises and affections which arise from a pure and well disposed mind, an happiness which no condition in life can exclude, no change of fortune interrupt or destroy. This will arm and fortify the mind against those pains, which result to the generality of mankind, from the contrary evils.

Hence it is evident, 1. That the happiness of such a creature as man, can never be at a stand, or continue a fixed invariable thing. His finite nature, let it rise ever so high, admits still higher degrees in improvements and perfection. And his progression in improvement, or virtue, always makes way for a progression in happiness, so that no possible point can be assigned in any period of his existence in which he is perfectly happy; that is, so happy as to exclude higher degrees of happiness. All his perfection is only comparative. 2. It appears that many things must conspire to complete the happiness of so variable a creature as man, subject to so many wants, and susceptible of such different pleasures. 3. As his capacities of pleasure cannot be all gratified at the same time, and must often interfere with each other in such a precarious and fleeting state as human life, or be frequently disappointed, perfect happiness, *i. e.* the undisturbed enjoyment of the several pleasures of which we are capable, is unattainable in our present state. 4. That state is mostly to be sought after, in which the fewest competitions and disappointments can happen, which least of all impairs any sense of pleasure, and opens an unexhausted source of the most refined and lasting enjoyments. 5. That state which is attended with all those advantages, is a state or course of virtue. 6. Therefore, a state of virtue, in which the moral goods of the mind are attained, is the happiest state.

HARAM, in the Turkish seraglio. See the article SERAGLIO.

HARANGUE, a speech made by an orator in public.

It is frequently used for a too pompous and prolix declamation.

HARBINGER, an officer of the king's houshold, having four yeomen under him, who ride a day's journey before the court, when it travels, to provide lodgings, *&c.*

HARBOROUGH, a town of Leicestershire, thirteen miles south-east of Leicester: west long. 1°, north lat. 52° 26′.

HARBOUR, a place where ships may ride safe at anchor, chiefly used in speaking of those secured by a boom and chain, and furnished with a mole. See the articles BOOM, CHAIN, and MOLE.

By many acts or parliament, persons casting and unlading ballast, rubbish, or the like, in any harbour or haven, forfeit 5l.

HARBOURING, among sportsmen, is said of a hart that goes to rest: hence to unharbour a deer, is to dislodge him.

HARBURGH, a port-town of Germany, in the circle of Lower Saxony, and dutchy of Lunenburg, situated on the river Elbe, opposite to Hamburg: east longitude 9° 30′, north latitude 53° 57′.

HARCOURT, a town of France, in the province of Normandy, twenty-three miles south-west of Rouen.

HARDENING, the giving a greater degree of hardness to bodies than they had before. See the article HARDNESS.

There are several ways of hardening iron and steel, as by hammering them, quenching them, when hot, in cold water, case-hardening, &c.

To harden english and swedish steel, being heated pretty hot, it is suddenly plunged in water; but spanish and venice steel requires only a blood-red heat, before it is quenched in the water: sometimes the steel is rubbed with a woollen rag, dipt in a mixture of powdered indigo and sallad-oil, while it is heating, and afterwards let cool of itself.

Case-HARDENING is performed after the following manner: take cow-horn or hoof, dry it well in an oven; pound it to powder; put as much bay-salt as of this powder into stale urine, or white-wine vinegar, and mix them well together; then cover the iron or steel with this mixture, and wrap it up in loam or plate-iron, so that the mixture may touch every part of the work; then put it into the fire, and blow the coals till the whole lump has a blood-red heat, but no higher, and then take it out and quench it.

HARDERWICK, a town of Guelderland, in the United Netherlands, twenty-three miles north-west of Zutphen: east long. 5° 30′, north lat 52° 35′.

HARDNESS, in physiology, that quality in bodies whereby their parts cohere firmly together, so as not to give way to any external impulse, nor yield inwards, without breaking.

In this sense hardness coincides with what on other occasions we call firmness, in opposition to softness and fluidity.

From that species of attraction called cohesion, it is easy to account for the different degrees of hardness in bodies: those whose constituent particles are flat or square, and so situated as to touch in many points, will be hard; those particles which are more round, and touch in fewer points, will constitute a softer body; those which are spherical, or nearly of that figure, will form a fluid. See the articles ATTRACTION and COHESION.

But nothing can conduce more to explain the nature of this doctrine, than the following passage of Sir Isaac Newton. "The parts of all homogeneal bodies, says he, which fully touch one another, stick together very strongly. And for explaining how this may be, some have invented hooked atoms, which is begging the question; and others tell us, that bodies are glued together by rest, that is by an occult quality, or rather by nothing; and others, that they stick together by conspiring motions, that is, by relative rest among themselves. I had rather infer from their cohesion, that their particles attract one another by some force, which in immediate contact, is exceeding strong; at small distances, performs many chemical operations, and reaches not far from the particles with any sensible effect. All bodies seem to be composed of hard particles: even the rays of light seem to be hard bodies; and therefore hardness may be reckoned the property of all incompounded matter: for all bodies, so far as experience reaches, are either hard, or may be hardened. Now if compound bodies are so hard as we find some of them to be, and yet are very porous, and consist of parts which are only laid together, the simple particles which are void of pores, and were never yet divided, must be much harder. For such hard particles being heaped up together, can scarce ever touch one another in more than a few points, and therefore must be separable by a much less force than is requisite to break a solid particle where parts touch in all the space between them, without any pores or interstices to weaken their cohesion. And how such very hard particles, which are only laid together, and touch only in a few points, can stick together, and that so firmly as they do, without the assistance of something which causes them to be attracted, or pressed towards one another is very difficult to conceive."

There are several ways, says Mr. Boyle, whereby a body may be put into a texture proper to make it hard, though for the most part one of them is not employed apart, but two or more in conjunction. The first and chiefest of these seem to be the fitness and shapes of the component particles to fasten them to each other, as if some were figured like the handles of buckets, and others like the hooks employed to draw them; some like buttons, others like loops; some like male, others like female screws; or as if many together were so variously branched, that their parts may be interwoven

woven one with another, and not prove easily separable: thus only, by twisting threads together, they are so well fastened to one another as to constitute a cable, which is not to be broken without a vast force. See the article ATOM.

And so numerous may be the correspondent figures fit to fasten bodies to one another, that it is very possible for two fluids, upon their conjunction, to intangle their parts, and thereby acquire such a new texture, that they cannot dissociate themselves, nor flow after the manner of liquors, but remain connected and unactive, as to become one intire hard body. See the article FREEZING.

HARDS, or HURDS, the coarser part of hemp or flax, separated from the fine. See the articles HEMP and FLAX.

HARE, in zoology, an animal of the lepus kind, distinguished by its abrupt tail, and black eyes. It greatly resembles the rabbit, but is larger, and somewhat longer, in proportion to its thickness; and its ears are remarkably long, being always in a position to receive the least sound, and moveable with surprising ease. See plate CXXVI. fig. 1.

The hare is a beast of venery, or of the forest, but peculiarly so termed in the second year of her age. There are reckoned four sorts of them, from the place of their abode: some live in the mountains, some in the fields, some in marshes, and some wander about every where. The mountain hares are the swiftest, the field hares are not so nimble, and those of the marshes are the slowest; but the wandering hares are the most dangerous to follow, for they are cunning in the ways and mazes of the fields, and knowing the nearest ways, run up the hills and rocks, to the confusion of the dogs, and the discouragement of the hunters. See the article HUNTING.

HARE-LIP, *labium leporinum*, in surgery. See the article LIP.

HARE'S EARS, *bupleurum*, in botany. See the article BUPLEURUM.

HARE'S LETTUCE, a name sometimes given to the sonchus, or sow-thistle.

HARE-STRONG, the same with peucedanum, or hog's fennel.

HARFLEUR, a port-town of France, in the province of Normandy, situated near the mouth of the Seyne, four miles west of Havre de Grace: east long. 15′, north lat. 49° 30′.

HARIOT, or HERIOT, in law, a due belonging to a lord at the death of his tenant, consisting of the best beast, either horse, ox, or cow, which he had at the time of his death; and in some manors, the best goods, piece of plate, &c. are called hariots.

There is both hariot-service, and hariot-custom: when a tenant holds by service to pay a hariot at his decease, which is expresly reserved in the deed of feofment, this is a hariot-service; and where hariots have been customarily paid time out of mind, after the death of a tenant for life, this is termed hariot-custom. For hariot-service, the lord may distrain any beast belonging to the tenant, that is on the land. For hariot-custom, the lord is to seise and not distrain; but he may seise the best beast that belonged to the tenant, tho' it be out of the manor, or in the king's highway, because he claims it as his proper goods by the death of his tenant. Nevertheless, where a woman marries and dies, the lord shall have no hariot-custom, because a feme-covert has no goods to pay as a hariot.

HARLEBECK, a town of the austrian Netherlands, in the province of Flanders, situated on the river Lys, six miles north-east of Courtray: east long. 3° 15′, north lat. 50° 50′.

HARLEQUIN, a buffoon or merry-andrew; but is now used for a person of extraordinary agility, dressed in party-coloured cloaths, the principal character in a pantomime entertainment. See the article PANTOMIME.

HARLESTON, a market-town of Norfolk, situated on the river Waveney, fourteen miles south of Norwich: east long. 1° 25′, north lat. 52° 35′.

HARLINGEN, a port-town of the United Netherlands, in the province of west Friesland, situated on the German sea: east longitude 5° 20′, north latitude 53° 15′.

HARLOT, a whore, or one that prostitutes her body for hire. These are liable to be committed to prison, and kept to hard labour. For the punishment of those who keep and entertain them, see the article BAWDY-HOUSE.

HARLOW, a market-town of Essex, situated fifteen miles west of Chelmsford: east long. 6′, north lat. 51° 45′.

HARMONIA, HARMONY, in music. See the article HARMONY.

HARMONIA, in anatomy, a species of articulation, being a kind of symphysis intended for absolute rest. See the article ARTICULATION.

HARMONICA, HARMONICS, among musicians. See the article HARMONICS.

HARMONICAL, ſomething belonging to harmony. See the article HARMONY.

HARMONICAL ARITHMETIC, that part of arithmetic which conſiders muſical intervals, expreſſed by numbers, in order to our finding their mutual relations, compoſitions and reſolutions.

HARMONICAL COMPOSITION, in a general ſenſe, includes both harmony and melody, *i. e.* of muſic or ſongs, both in a ſingle part, and in ſeveral parts.

In its more proper and limited ſenſe, harmonical compoſition is reſtrained to that of harmony; and may be defined the art of diſpoſing and concerting ſeveral ſingle parts together, ſo as to make one agreeable whole. See HARMONY, COMPOSITION, and COUNTER POINT.

HARMONICAL DIVISION, in muſic. See the artical DIVISION.

HARMONICAL INTERVAL, in muſic, denotes the difference of two ſounds, which is agreeable to the ear, whether in conſonance or ſucceſſion; and are, therefore, the ſame with concord. See the articles CONCORD and INTERVAL.

HARMONICAL PROPORTION. See the article PROPORTION.

HARMONICAL SERIES, a ſeries of many numbers in continual harmonical proportion. Thus if there are four or more numbers, of which every three immediate terms are harmonical, the whole will make an harmonical ſeries: ſuch is 30 : 20 : 15 : 12 : 10. Or, if every four terms immediately next each other are harmonical, it is alſo a continual harmonical ſeries, but of another ſpecies, as 3, 4, 6, 9, 18, 36, &c.

HARMONICAL SOUNDS, an appellation given, by Mr. Sauveur, to ſuch ſounds as always make a determinate number of vibrations, in the time that one of the fundamentals, to which they are referred, makes one vibration.

Harmonical ſounds are produced by the parts of chords, &c. which vibrate a certain number of times, while the whole chord vibrates once.

The relations of ſounds had only been conſidered in the ſeries of numbers, 1 : 2, 2 : 3, 3 : 4, 4 : 5, &c. which produced the intervals called octave, fifth, fourth, third, &c. Mr. Sauveur firſt conſidered them in the natural ſeries, 1, 2, 3, 4, 5, &c. and examined the relations of ſounds ariſing therefrom. The reſult is, that the firſt interval, 1 : 2, is an octave; the ſecond, 1 : 3, a twelfth; the third, 1 : 4, a fifteenth, or double octave; the fourth, 1 : 5, a ſeventeenth; the fifth, 1 : 6, a nineteenth, &c.

This new conſideration of the relations of ſounds, is more natural than the old one; and is, in effect, all the muſic that nature makes without the aſſiſtance of art. See the articles CHORD, ORGAN, &c.

HARMONICS, *harmonica*, that part of muſic which conſidered the differences and proportions of ſounds, with reſpect to acute and grave; in contradiſtinction to rythmica and metrica.

The harmonics is the only part of the antient muſic whereof we have any tolerable account. According to Mr. Malcolm, the doctrine of harmonics was reduced into ſeven parts, *viz.* of ſounds, of intervals, of ſyſtems, of the genera, of the tones or modes, of mutation, and of the melopœia. See the articles SOUND, INTERVAL, &c.

HARMONY, ἁρμονια, in muſic, the agreeable reſult, or union, of ſeveral muſical ſounds, heard at one and the ſame time; or the mixture of divers ſounds, which together have an effect agreeable to the ear. See the article SOUND.

As a continued ſucceſſion of muſical ſounds produces melody, ſo does a continued combination of theſe produce harmony. See the article MELODY.

Among the antients, however, as alſo ſometimes among the moderns, harmony is uſed in the ſtrict ſenſe of conſonance, and is equivalent to ſymphony; and concord and harmony do in reality ſignify the ſame thing, though cuſtom has made a little difference between them. See the articles SYMPHONY, &c.

The antients, ſays Mr. Malcolm, ſeem to have been entirely unacquainted with harmony, the ſoul of modern muſic: in all their explications of the melopœia, they ſay not a word of concert, or the harmony of parts. We have inſtances, indeed, continues that author, of their joining ſeveral voices or inſtruments in conſonance; but then theſe voices and inſtruments are not ſo joined as that each had a diſtinct and proper melody, and ſo made a ſucceſſion of various concords; but were either uniſons or octaves in every note; and ſo all performed the ſame individual melody, and ſo conſtituted one ſong.

When the parts differ not in the tenſion of the whole, but in the different relations of the ſucceſſive notes, it is this that conſtitutes the modern art of harmony. See MUSIC.

To underſtand the nature, and determine

mine the number and preference of harmonies, it is to be confidered, that in every compound found, where there are not more than three fimple ones, there are three kinds of relations, *viz.* primary relation of every fimple found to the fundamental or graveft, whereby they make different degrees of concord with it; the mutual relations of the acute founds each with the other, whereby they mix concord or difcord into the compound; and the fecondary relation of the whole, whereby all the terms unite their vibrations, and coincide more or lefs frequently.

Suppofe four founds A, B, C, D, whereof A is the graveft, B the next, then C, and D the acuteft. Here A is the fundamental, and the relations of B, C, and D are primary relations: fo if B be a third greater above A, that primary relation is 4 to 5; and if C be a fifth to A, that primary relation is 2 to 3; and if D be an octave to A, that is 1 to 2. For the mutual relations of the acute terms B, C, D, they are had by taking their primary relations to the fundamental, and fubtracting each leffer from each greater: thus B to C is 5 to 6, a third leffer; B to D, 5 to 8, a fixth leffer, &c. Laftly, to find the fecondary relation of the whole, feek the leaft common dividend to all the leffer terms or numbers of the primary relations, *i. e.* the leaft number that will be divided by each of them exactly, this is the thing fought, and fhews that all the fimple founds coincide after fo many vibrations of the fundamental as the number expreffes.

So in the preceding example, the leffer terms of the three primary relations are 4, 2, 1, whofe leaft common dividend is 4, confequently at every fourth vibration of the fundamental, the whole will coincide.

The proper ingredients of harmony are concords; and all difcords, at leaft in the primary and mutual relations, are abfolutely forbidden. It is true, difcords are ufed in mufic, but not of themfelves fimply, but only to fet off the concords by their contraft and oppofition. Hence, any number of concords being propofed to ftand in primary relations with a common fundamental, we difcover whether or no they conftitute perfect harmony, by finding their mutual relations: thus, fuppofe the following concord or primary relations, *viz.* the greater third, fifth, and octave given, their mutual relations are all concord, and therefore may ftand in harmony; for the greater third and fifth are to one another as 5 to 6, a leffer third; the greater third and octave, as 5 to 8, a leffer fixth; and the fifth and octave, as 3 to 4, a fourth. But if fourth, fifth, and octave be propofed, it is evident they cannot ftand in harmony, by reafon between the fourth and fifth there is a difcord, *viz.* the ratio 8 to 9. Again, fuppofing any number of founds which are concord each to the next, from the loweft to the higheft; to know if they can ftand in harmony, we muft find the primary and all the mutual relations, which muft be all concord: thus the following ones cannot, *viz.* 4, 6, 9, by reafon 4 to 9 is a difcord.

The perfection of harmonies depends on all the three relations, it is not the beft primary relation that makes the beft harmony; for then a fourth and a fifth muft be better than a fourth and a fixth, whereas the firft two cannot ftand together, becaufe of the difcord of the mutual relation. Nor does the beft fecondary relation carry it; for then would a fourth and a fifth, whofe fecondary relation, with one common fundamental, is 6, be better than a third and fifth, whofe fecondary relation is 10: but here alfo the preference is due to the better mutual relations. Indeed, the mutual relations depend on the primary, though not fo as that the beft primary fhall always produce the beft mutual relations. However, the primary relations are of the moft importance; and, together with the fecondary, afford us the following rule for determining the preference of harmonies, *viz.* comparing two harmonies together that have an equal number of terms, that which has the beft primary and fecondary relations, is the moft perfect. But in cafes where the advantage lies in the primary relation of the one, and in the fecondary of the other, we have no certain rule; the primary are certainly the moft confiderable, but how the advantage in thefe ought to be proportioned to the difadvantage of the other, or *vice verfa*, we know not; fo that a well-tuned ear muft be the laft refort in thefe cafes.

Harmony is divided into fimple and compound.

Simple HARMONY is that in which there is no concord to the fundamental above an octave.

octave. The ingredients of simple harmony are the seven original simple concords, of which there can be but eighteen different combinations that are harmony, which are gived in the following table from Mr. Malcolm.

TABLE of SIMPLE HARMONIES.

Secondary Relations.					Secondary Relations.			
Fifth	octave	2	third greater	fifth	4	third greater	fifth	octave
Fourth	octave	3	third less	fifth	10	third less	fifth	octave
Sixth greater	octave	3	fourth	sixth greater	3	fourth	sixth greater	octave
Third greater	octave	4	third greater	sixth greater	12	third greater	sixth greater	octave
Third less	octave	5	third less	sixth less	5	third less	sixth less	octave
Sixth less	octave	5	fourth	sixth less	15	fourth	sixth less	octave

These are all the possible combinations of the concords, that are harmony; for the octave is compounded of a fifth and a fourth, or a sixth and a third, which have the variety of greater and lesser: out of these are the first six harmonies composed. Then the fifth being composed of a greater and a lesser third, and the sixth of a fourth and third; from these proceed the next six harmonies of the table: then an octave joined to each of these six, make the last six of the table.

The perfection of the first twelve is, according to the order of the table; of the first six each has an octave, and their preference is according to the perfection of that other lesser concord joined to the octave. For the next six, the preference is given to the two combinations with the fifth, whereof that which has the third greater is the best. For the last six, they are not placed last, because the least perfect, but because they are the most complex, and are the mixtures of the other twelve with each other: in point of perfection, they are plainly preferable to the preceding six, as having the same ingredients with an octave more.

Compound HARMONY is that which to the harmony of one octave, adds that of another. For the compound harmonies, their varieties are easily found out of the combinations of the simple harmonies of several octaves.

Harmony may also be divided into that of concords and, that of discords. The first is that which we have hitherto considered, wherein nothing but concords are admitted: the second is that wherein discords are used, and mixed with concords. See the articles CONCORD and DISCORD.

Composition of HARMONY. See the article COMPOSITION.

HARMONY is also sometimes used to denote an agreement, suitableness, union, conformity, *&c.* thus, in music, we sometimes apply it to a single voice, when sonorous, clear, and soft; to a single instrument, when it yields a very agreeable sound: in matters of literature, we use it for a certain agreement between the several parts of the discourse: in architecture, harmony denotes an agreeable relation between the parts of a building; in painting, they speak of an harmony both in the ordonance and composition, and in the colours of a picture; in the ordonance it signifies the union or connection between the figures, with respect to the subject of the piece; in the colours, it denotes the union or agreeable mixture of different colours. See the article COLOURING, *&c.*

HARMONY *of the spheres*, or *Celestial* HARMONY, a sort of music much talked of by many of the antient philosophers and fathers, supposed to be produced by the sweetly tuned motions of the stars and planets. This harmony they attributed to the various proportionate impressions of the heavenly globes upon one another, acting at proper intervals. It is impossible, according to them, that such prodigious large bodies, moving with so much rapidity, should be silent; on the contrary, the atmosphere continually impelled by them, must yield a set of sounds proportionate to the impression it receives; consequently as they do not all run the same circuit, nor with one and the same velocity, the different tones arising from the diversity of motions, directed by the hand of the Almighty, must form an admirable symphony, or concert.

They therefore supposed, that the moon, as being the lowest of the planets, corresponded to *mi*; mercury, to *fa*; venus, to *sol*; the sun, to *la*; mars, to *si*; jupiter, to *ut*; saturn, to *re*; and the orb of the fixed stars, as being the highest of all, to *mi*, or the octave.

Pre-established HARMONY, a celebrated system of M. Leibnitz, by means whereof he accounts for the union or communication between soul and body. The philosophers had universally held, that the soul and the body act physically on each other. Des Cartes first shewed that the heterogeneity of their natures did not allow of such real union; and that they could only have an apparent one, whereof God is the mediator. M. Leibnitz, unsatisfied with either of these hypotheses, establishes a third: a soul or spirit, he observes, is to have a certain series of thoughts, desires, and wills; a body, which is only a machine, is to have a certain series of motions, to be determined by the combination of its mechanical disposition, with the impressions of external objects.

If now there be found a soul and a body so framed, that the whole series of wills of the soul, and the whole series of motions of the body, exactly correspond; and at the same time, for instance, when the soul desires to go to any place, the two feet move mechanically that way: this soul and body will have a relation to one another; not by any actual union between them, but by the constant and perpetual correspondence of the several actions of both. Now God puts together this soul and body, which had such a correspondence antecedent to their union. And the same is to be understood of all the other souls and bodies, that have been or ever will be joined.

In effect the laws of motion in the body, succeeding in the order of efficient causes, do all agree and correspond with the ideas of the soul; so that the body is determined to act at the time when the soul wills. The same principle he extends further, and makes a pre-established harmony between the kingdoms of nature and grace, to account for the apparent communication between them, and makes physical and moral evil correspond. For a farther account of his manner of reasoning upon this doctrine, we refer the reader to his Essais de Theodicée.

HARMOSTES, in grecian antiquity, an appellation given to several magistrates among the Spartans, whose business was to look to the building of citadels, the reparation of forts and fortifications, and the like.

HARNESS, the furniture put upon a horse to draw in a coach, or other wheel-carriage.

HARNESS-GALLS, swellings or soreness on the breasts of coach-horses, occasioned by the galling of the harness, especially in rainy weather.

To cure this, first shave off the hair about the sore very close, and rub the whole breast with a lather of water and black-soap; then wash that part of the breast which is usually covered with the petrel, with salt-water, suffering it to dry of itself. If the hardness of any part of the harness occasions the galling, take it away, or cover it with little bolsters.

HARO, or HAROL, *clamor de haro*, in our old customs, an out cry after felons, the original of which came from the Normans. See the article HUE and CRY.

HARP, a musical instrument of the string-kind, of a triangular figure, held upright between the legs of the person who plays upon it.

There is some diversity in the structure of harps. That called the triple harp, has three rows of strings or chords, which in all make seventy-eight, or four octaves; the second row makes the half-turn, and the third is unison with the first. There are two rows of pins on the right side, called buttons, that serve to keep the strings tight in their holes, which is fastened at the other end to three rows of pins on the upper side, called the keys. This instrument is struck with the fingers and thumbs of both hands: its music is like that of the spinet, all its strings going by semi-tones; whence some have called it the inverted spinet. There are among us two sorts of this instrument, *viz.* the irish harp, which is strung with wire; and the welch harp, strung with gut.

King David is usually painted with a harp in his hands; but we have no testimony in all antiquity, that the hebrew harp was any thing like ours: on a jewish medal of Simon Maccabæus, we see two sorts of musical instruments, but they are both of them different from our harp, having only three or four strings. The harp in use among the antient Jews, is supposed to be more like a lute, or a guittar, than the instrument above described, which it is thought was invented either by the Cimbri, or the Anglo-saxons.

Bell-HARP, a musical instrument of the string-kind, thus called from the common players upon it, swinging it about as a bell on its bias.

It is about three feet long; its strings, which are of no determinate number, are

are of brafs or fteel-wire, fixed at one end, and ftretched a-crofs the found-board, by fcrews fixed at the other end. It takes in four octaves, according to the number of the ftrings, which are ftruck only with the thumbs, the right hand playing the treble, and the left the bafs; and in order to draw the found the clearer, the thumbs are armed with a little wire-pin. This may perhaps be the lyra or cythara of the antients; but we find no mention of it under the name it now bears, which muft be allowed to be modern.

Harp-shell, in ichthyology, the elliptic, longitudinally coftated dolium. See Dolium.

This is one of the moft beautiful fhells of this genus: it is about two inches and a half long, and a little more than an inch and a half in diameter; the clavicle has five volutions; the whole furface of the body of the fhell is ornamented with large and elevated ribs, and the colour is a deep brown, variegated in a beautiful manner with a paler brown.

HARPEGGIATO, or Harpeggio, in mufic, is to caufe the feveral founds of one accord to be heard diftinctly one after the other, beginning with either at pleafure, but commonly with the loweft.

HARPIES, *harpyiæ*, ἅρπυιαι, among the antient poets, fabulous impure monfters, faid to be the daughters of Neptune and Earth. Virgil mentions three of them, Aello, Ocypete, and Celœno; they are defcribed to be fowls with the face of a virgin, bear's ears, their bodies like vultures, and hands like their crooked talons. Virg. Æn. III.

HARPINEER, or Harponeer, the perfon who manages the harping-iron. See the next article.

HARPING-IRON, or Harpoon, a large fpear or javelin, made of forged iron, and five or fix feet long; it is faftened to a line, and ufed in the whale-fifhery. See the article Fishery.

HARPINGS, in a fhip, properly denote her breadth at the bow. Some alfo give the fame name to the ends of the bends that are faftened into the ftern.

HARPSICHORD, the moft harmonious of all the mufical inftruments of the ftring-kind. It is played on after the manner of the organ, and is furnifhed with a fet and fometimes with two fets of keys; the touching or ftriking of thefe keys, move a kind of little jacks, which alfo move a double row of chords or ftrings, of brafs or iron, ftretched over four bridges on the table of the inftrument.

HARQUEBUSS, a piece of fire arms, of the length of a mufquet, ufually cocked with a wheel. It carried a ball that weighed one ounce feven eighths.

There was alfo a larger fort, called the great harquebufs, ufed for the defence of ftrong places, which carried a ball of about three ounces and a half: but they are now but little ufed, except in fome old caftles, and by the French in fome of their garrifons.

HARRIER, a kind of hound, endowed with an admirable gift of fmelling, and very bold in the purfuit of his game.

There are feveral kinds of harriers; fome being for the hare, the fox, the wolf, hart, weafel, badger, &c.

HARROW, in agriculture, an inftrument ufed by hufbandmen, to break the clods of earth, and to draw the ground over the feed when fown. It is a fort of wooden drag, made in form of a fquare, with large iron teeth, or tines, not unlike thofe of a herfe. See Herse.

HART, a ftag, or male deer, in the fixth year. See Stag and Cervus.

Hart-royal, one that has been hunted by the king or queen, and efcaped with life; in which cafe proclamation is ufually made, that none kill or offend him, as being a hart-royal proclaimed.

Hart-hunting. See Hunting.

Hart's horns, *cornua cervi*, in pharmacy, the whole horns of the common male deer, as feparated from the head, without farther preparation.

The chemical analyfis of hart's horn is fufficiently known: it yields a water highly impregnated with a volatile falt, which is called fpirit of hart's horn, with a fetid oil, and a volatile falt by the common diftillation in a retort. The remainder in the bottom of the retort, after the diftillation is finifhed, is black; but on being calcined in an open fire, it becomes white and friable, and is what is kept in the fhops under the name of burnt hart's horn. Befide thefe preparations, we ufe the thin fhavings of the horns, which, on long boiling in water, become a jelly: this jelly is nutritive and ftrengthening; it is fometimes given in diarrhœas; but a decoction of burnt hart's horn in water, is more frequently ufed for this purpofe, and is what is called hart's horn drink.

The falt of hart's horn is a great fudorific, and is given in fevers of many kinds with

with great ſucceſs; the ſpirit has the ſame and all the other virtues of volatile alkalis, and is uſed to bring people out of faintings by its pungency, on holding it under their noſe, and at the ſame time pouring ſome drops of it in water down the perſon's throat.

HART-WORT, *tordyllium,* in botany. See the article TORDYLLIUM.

Ethiopian HART-WORT, a plant more uſually called peucedanum, or hog's fennel.

HARTFORD, the capital of Hartfordſhire, ſituated twenty-one miles north of London: weſt long. 7′, and north lat. 51° 45′.

HARTFORD is alſo a town of New England, in the province of Connecticut, ſituated fifty miles weſt of Boſton: weſt long. 71° 15′, and north lat. 42°.

HARTLAND, a market-town of Devon, ſituated near the Briſtol-channel; it gives name to a cape, called Hartland-point, at the entrance of the Briſtol channel: weſt long. 4° 45′, and north lat. 51° 9′.

HARTLEPOOL, a port-town of the county of Durham, ſituated on the German ocean, fourteen miles ſouth-eaſt of Durham: weſt long. 55′, and north lat. 54° 40′.

HARVEST, the time or ſeaſon that the corn is ripe, and fit to be reaped and taken into barns.

HARVEST FLY, in zoology, a large four-winged-fly, of the cicada-kind, very common in Italy, and erroneouſly ſuppoſed to be a graſshopper. See the article CICADA.

HARUSPEX, or ARUSPEX, in roman antiquity. See ARUSPICES.

HARWICH, a borough and port town of Eſſex, ſixty-two miles north-eaſt of London: eaſt long. 1° 25′, north lat. 52° 5′. It ſends two members to parliament.

HASEL, or HAZLE. See HAZLE.

HASLEM, an iſland of Denmark, in the Categate-ſea, north of the iſland of Zealand.

HASLEMERE, a borough town of Surry, thirty-eight miles ſouth-weſt of London, and ten miles ſouth-weſt of Guildford.

It ſends two members to parliament.

HASSELT, a town of Weſtphalia, in Germany, fifteen miles north-weſt of Maeſtricht.

HASSIDEANS, or ASSIDEANS, an appellation given to thoſe Jews who reſorted to Mattathias, to fight for the law of God, and the liberties of their country.

HASSOCK, a baſs made of ruſhes, to kneel or reſt the feet upon in churches.

HASTA, among medaliſts, a kind of javelin, not ſhod or headed with iron; or rather an antient ſort of ſcepter, longer than ordinary, occaſionally given to all the gods.

HASTATED LEAF, among botaniſts, one reſembling the head of an halbert. See plate CXXVI. fig. 4.

HASTINGS, a borough-town of Suſſex, ſituated on the coaſt of the Engliſh channel, fifty miles ſouth-eaſt of London: eaſt longitude 36′, and north latitude 50° 50′.

HAT, a covering for the head, worn by the men in moſt parts of Europe. Thoſe moſt in eſteem are made of the pure hair of the caſtor or beaver; for they are alſo made of the hair or wool of divers other animals, and that by much the ſame proceſs.

Method of making HATS. To make the beaver-hats, they tear off the long and ſhort hair from the ſkin, with knives ſuitable to the occaſion. After which they proportion the quantity of the ſeveral ſorts of beaver hair, by mixing one third of the dry caſtor to two thirds of old coat, which is a term for a ſkin that has been worn ſome time by the Indians of America, who catch and ſell them to the Europeans. The hair, ſo mixed, is carded and weighed out into parcels, according to the ſize and thickneſs of the hat intended. The ſtuff is now laid on the hurdle, with an inſtrument called a bow, reſembling that of a violin, but larger; whoſe ſtring being worked with a ſmall bow ſtick, and made to play on the furs, they fly, and mix themſelves together, the duſt and filth at the ſame time paſſing through the chinks. Inſtead of a bow, ſome hat-makers uſe a ſearce of hair, through which they paſs the ſtuff. Thus hats are formed of an oval figure, ending with an acute angle at the top: with what ſtuff remains they ſtrengthen them where ſlendereſt, yet deſignedly make them thicker in the brim near the crown, than towards the circumference, or in the crown itſelf. They next harden the ſtuff, ſo managed, into more compact flakes, by preſſing down a hardened leather upon it. This done, they are carried to the baſon, upon which laying one of the hardened hats they ſprinkle it over with water, and mould it; and the heat of the fire, with the water and preſſing, imbody the ſtuff into a ſligh

hairy sort of felt; after which, turning up the edges all round over the mould, they lay it by, and proceed with another, which being in like manner reduced to the same consistence and form, they are both joined together, so as to make them meet in an angle at top, making only one conical cap. The next process is to remove the hat to a trough, resembling a mill-hopper, which is a copper-kettle filled with water and grounds, kept hot for the purpose; and, after being dipped in the kettle, the hat is laid on the sloping side, called the plank. Here they proceed to work it, by rolling and unrolling it again and again, one part after another, first with the hand, and afterwards with a small wooden roller, taking care to dip it from time to time, till at length, by thus fulling and thickening it four or five hours, it is brought to the dimensions intended. In this violent labour, the workmen usually guard their hands with thick leather, which they call gloves. The hat thus wrought into the form of a conical cap, is reduced into proper shape on a block of the size of the intended crown, by tying it round with a string, called a commander; after which, with a bent iron, called a stamper, they gradually beat down the commander all round, till it has reached the bottom of the block, and what remains at the bottom below the strings forms the brim. In this station it is set to dry, and afterwards singed, by holding it over the blaze of a fire, made of straw, or shavings: it is then rubbed with pumice-stone, to take off the coarser nap; then rubbed over with seal-skin, to lay the nap still finer; and lastly, carded with a fine card, to raise the fine cotton, with which the hat is to appear when finished: then fitting it to the block, they tie it, cut round the edges, and deliver it to the dyers. See the article DYEING.

The dye being compleated, the hat is dried by being hung in the roof of a stove heated with a charcoal fire; and, when dry, it is stiffened with melted glue, or rather gum-senega, which is smeared over the hat with a brush, and rubbed in with the hand. Then, having spread a cloth over the steaming bason, which is a little fireplace raised about three feet high, with an iron plate laid over it, exactly covering the fire, the hat is laid upon the cloth, with the brim downwards, the cloth being first sprinkled with water, to raise a strong steam, to force in the stiffening. When it is moderately hot, the workmen strikes gently on the brim, with the flat of his hand, to make the joinings incorporate and bind so as not to appear, turning it from time to time, and at last setting it on the crown. And when it has been sufficiently steamed and dried, it is put again on the block, brushed, ironed, well smoothed, and fitted for lining.

Hats make a considerable article in commerce: England supplies Spain, Portugal, Italy, and Germany, with extraordinary quantities of them; and as our manufacturers have the reputation of making the best hats in Europe, their importation is prohibited.

HATS are also made for women's wear, of chips, straw, or cane, by platting, and sewing the plats together; beginning with the center of the crown, and working round till the whole is finished. Hats for the same purpose are also wove and made of horse-hair, silk, &c. Straw hats knotted, pay on importation 1 s. $3\frac{40}{100}$d. the dozen, and draw back 1 s. $1\frac{50}{100}$d. Straw-hats plain, pay $3\frac{46\frac{1}{2}}{100}$d. the dozen, and draw back $3\frac{3\frac{3}{4}}{100}$d.

HAT-BAND, a band to tie or buckle round the crown of a hat, in order to let it out, or draw it closer to the head. These are of several sorts. They pay on importation 19s. 3 d. the gross, and draw back 16 s. $10\frac{50}{100}$d.

HATCHEL, or HITCHEL, a tool with which flax and hemp are combed into fine hairs. It consists of long iron-pins, or teeth, regularly set in a piece of board. See plate CXXVI. fig. 2.

There are several sorts of hatchels, each finer than the other, with which flax and hemp are prepared for spinning. See the articles FLAX and HEMP.

HATCHES, in a ship, a kind of trap-doors between the main-mast and fore-mast, through which all goods of bulk are let down into the hold.

Coamings of the HATCHES, are the pieces of timber, or planks, which raise up the hatches, when they are made higher than the rest of the deck.

HATCH-WAY, the place where the hatches are. Thus, to lay a thing in the hatch-way, is to put it so, that the hatches cannot be become at, or opened.

HATCHES also denote flood-gates set in a river, &c. to stop the current of the water, particularly certain dams or mounds made

made of rubbiſh, clay, or earth, to prevent the water that iſſues from the ſtream-works and tin-waſhes in Cornwal, from running into the freſh rivers.

HATCHET, a ſmall light ſort of an ax, with a baſil-edge on its left ſide, and a ſhort handle, as being to be uſed with one hand.

Hatchets are uſed by various artificers, and more particularly in hewing of wood.

Hatchets and axes pay on importation 1 s. $3\frac{40}{100}$d. the dozen, and draw back 1 s. $1\frac{50}{100}$d. And for every 112 lb. of iron 4 s. $8\frac{25}{100}$d. which is repaid on exportation.

HATCHING, the maturating fecundated eggs, whether by the incubation and warmth of the parent bird, or by artificial heat, ſo as to produce young chickens alive.

The art of hatching chickens by means of ovens has long been practiſed in Egypt; but it is there only known to the inhabitants of a ſingle village named Berme, and to thoſe that live at a ſmall diſtance from it. Towards the beginning of autumn they ſcatter themſelves all over the country, where each perſon among them is ready to undertake the management of an oven, each of which is of a different ſize, but in general they are capable of containing from forty to fourſcore thouſand eggs. The number of theſe ovens placed up and down the country is about three hundred and eighty-ſix, and they uſually keep them working for about ſix months: as therefore each brood takes up in an oven, as under a hen, only twenty-one days, it is eaſy in every one of them to hatch eight different broods of chickens. Every Bermean is under the obligation of delivering to the perſon who intruſts him with an oven, only two thirds of as many chickens as there have been eggs put under his care; and he is a gainer by this bargain, as more than two thirds of the eggs uſually produce chickens. In order to make a calculation of the number of chickens yearly ſo hatched in Egypt, it has been ſuppoſed that only two thirds of the eggs are hatched, and that each brood conſiſts of at leaſt thirty thouſand chickens; and thus it would appear that the ovens of Egypt give life yearly to at leaſt ninety-two millions ſix hundred and forty-thouſand of theſe animals.

This uſeful and advantageous method of hatching eggs has been lately diſcovered in France, by the ingenious Mr. Reaumur, who, by a number of experiments, has reduced the art to certain principles. He found by experience that the heat neceſſary for this purpoſe is nearly the ſame with that marked 32 on his thermometer, or that marked 96 on Farenheit's. This degree of heat is nearly that of the ſkin of the hen, and what is remarkable of the ſkin of all other domeſtic fowls, and probably of all other kinds of birds. The degree of heat which brings about the developement of the cygnet, the goſling, and the turkey-pout, is the ſame as that which fits for hatching the canary-ſongſter, and, in all probability, the ſmalleſt humming-bird: the difference is only in the time during which this heat ought to be communicated to the eggs of different birds: it will bring the canary bird to perfection in eleven or twelve days, while the turkey-pout will require twenty-ſeven or twenty-eight.

After many experiments, Mr. Reaumur found that ſtoves heated by means of a baker's oven, ſucceeded better than thoſe made hot by layers of dung: and the furnaces of glaſs-houſes and thoſe of the melters of metals, by means of pipes, to convey heat into a room, might, no doubt, be made to anſwer the ſame purpoſe. As to the form of the ſtoves, no great nicety is required: a chamber over an oven will do very well; nothing more will be neceſſary but to aſcertain the degree of heat, which may be done by melting a lump of butter, of the ſize of a walnut, with half as much tallow, and putting it into a phial; this will ſerve to indicate the heat with ſufficient exactneſs, for when it is too great, this mixture will become as liquid as oil, and when the heat is too ſmall, it will remain fixed in a lump; but it will flow like a thick ſyrup, upon inclining the bottle, if the ſtove be of a right temper: great attention therefore ſhould to be given to keep the heat always at this degree, by letting in freſh air, if it be too great, or ſhutting the ſtove more cloſe, if it be too ſmall; and that all the eggs in the ſtove may equally ſhare the irregularities of the heat, it will be neceſſary to ſhift them from the ſides to the center; thereby imitating the hens, who are frequently ſeen to make uſe of their bills, to puſh to the outer parts thoſe eggs that were neareſt to the middle of their neſts, and to bring into

into the middle such as lay nearest the sides.

Mr. Reaumur has invented a sort of low boxes, without bottoms, and lined with furs. These, which he calls artificial-parents, not only shelter the chickens from the injuries of the air, but afford a kindly warmth, so that they presently take the benefit of their shelter as readily as they would have done under the wings of a hen. After hatching, it will be necessary to keep the chickens, for some time, in a room artfully heated and furnished with these boxes; but afterwards they may be safely exposed to the air in the court-yard, in which it may not be amiss to place one of these artificial parents to shelter them if there should be occasion for it.

As to the manner of feeding the young brood, they are generally a whole day after being hatched, before they take any food at all; and then a few crumbs of bread may be given them for a day or two, after which they will begin to pick up insects and grass for themselves.

But to save the trouble of attending them, capons may be taught to watch them in the same manner as hens do. Mr. Reaumur assures us that he has seen above two hundred chickens at once, all led about and defended only by three or four such capons. Nay, cocks may be taught to perform the same office, which they, as well as the capons, will continue to do all their lives after.

HATCHING, or HACHING, in designing, *&c.* the making of lines with a pen, pencil, graver, or the like; and the intersecting or going across those lines with others drawn a contrary way, is called counter-hatching. The depths and shadows of draughts are usually formed by hatching.

Hatching is of singular use in heraldry, to distinguish the several colours of a shield, without being illumined: thus, gules or red is hatched by lines drawn from the top to the bottom; azure, by lines drawn across the shield; and so of other colours. See the articles GULES, AZURE, *&c.*

HATCHMENT, in heraldry, a name sometimes used for an atchievement, or escutcheon over a gate, door, or on the side of an house.

HATCHMENT, also signifies the marshalling of several coats of arms in an escutcheon. See the article MARSHALLING.

HATFIELD, a market-town of Hartfordshire, situated twenty miles north-west of London.

HATFIELD BROADOAK, or KING'S HATFIELD, a market-town of Essex, twelve miles from Chelmsford, and twenty-eight from London.

HATHERLY, a market-town of Devonshire, twenty miles north-west of Exeter.

HATTEM, a town of Gelderland, one of the United Provinces: east longitude 6°, north latitude 52° 30′.

HATTOCK, a shock of corn containing twelve sheaves: others make it only three sheaves laid together.

HATUAN, a town of Upper Hungary, fifteen miles north-east of Buda: east long. 19° 35′, and north lat. 47° 48′.

HAVANNA, a port-town of the island of Cuba, in America, situated at the entrance of the gulph of Mexico; subject to Spain: west long. 84°, and north lat. 23°.

HAVANT, a market-town of Hampshire, six miles north east of Portsmouth.

HAVEL, a river of Brandenburg, in Germany, which receives the river Spree, near Berlin, and discharges itself into the Elbe, a little below Havelburg.

HAVELBURG, a town of Germany, in the circle of Upper Saxony, and marquisate of Brandenburg, subject to the king of Prussia: east long. 12° 44′, and north lat. 53°.

HAVEN, a sea port or harbour. See the article HARBOUR.

HAVER, a term used by country-people for oats.

HAVERFORD-WEST, a borough-town of Pembrokeshire, in South Wales, situated twelve miles south-east of St. David's.

It sends only one member to parliament.

HAVERIL, a market-town of Essex, twenty-four miles north of Chelmsford.

HAUGH, or HAW. See the article HAW.

HAUNCH, or HANCH, the hip, or that part of the body between the last ribs and the thigh. See the article HIP.

The haunches of a horse are too long, if, when standing in the stable, he limps with his hind legs farther back than he ought; and when the top or onset of his tail is not in a perpendicular line to the tip of his hocks, as it always does in horses whose haunches are of a just length. There are some horses, which, though they have too long haunches, yet commonly walk well: such are good to climb hills, but are not at all sure upon a descent,

a defcent, for they cannot ply their hams, and never gallop flowly, but always nearly upon a full fpeed.

The art of riding the great-horfe has not a more neceffary leffon than that of putting a horfe upon his haunches, which in other words is called coupling him well, or putting him well together, or compact. A horfe that cannot bend or lower his haunches, throws himfelf too much upon his fhoulder, and lies heavy upon the bridle.

HAUNT, among fportfmen, the place to which game are accuftomed to refort: among hunters, it is the walk of a deer, or the place of his ordinary paffage.

All kinds of large fowl that divide the foot, have their haunts by the fides of fhallow rivers, brooks, and plafhes of water; they delight in boggy places and the dry parts of fens over-grown with rufhes, reeds, and fedges, in half drowned moors, and the hollow vales of downs and heaths, where there is fhelter for them to lurk in obfcurity. Thefe do not appear in flocks, but they are the beft flight for hawks that can be imagined.

The leffer fowl, which are web-footed, continually haunt drowned fens, the main ftream of rivers where the current is fwifteft, and all places where there is plenty of water, in which they may fwim undifturbed by man or beaft; the wild-goofe and barnacle excepted, who like no water above their founding, and feek none but fhallow places. Thefe laft are inconceivably delighted with green winter corn, and may always be found where it is fown, efpecially if the ends of the lands have much water about them.

The fmaller fowl frequent fmall brooks, rivers, ponds, drowned meadows, loughs or lakes, efpecially if ftored with unfrequented iflands well furnifhed with fhrubs, rufhes, reeds, &c.

HAVRE, in geography, a french term fignifying haven. Hence,

Havre de grace is a port-town of France, in the province of Normandy, fituated on the Englifh channel, at the mouth of the river Seyne; eaft long. 10′, and north lat. 49° 30′.

HAUTBOY, a mufical inftrument of the wind kind, fhaped much like the flute, only that it fpreads and widens towards the bottom, and is founded through a reed. The treble is two feet long; the tenor goes a fifth lower, when blown open: it has only eight holes; but the bafs, which is five feet long, has eleven.

HAW, in botany, &c. a fort of berry, the fruit of feveral fpecies of mefpilus, thence denominated haw-thorns. See the article Mespilus.

Haw, among farriers, an excrefcence refembling a griftle, growing under the nether eye-lid and eye of a horfe, which, if not timely removed, will put it quite out. It proceeds from grofs, tough, and phlegmatic humours, which falling from the head, and there uniting together, grow to this infirmity; the figns of which are the watering of the eye, and the involuntary opening of the under eye-lid.

Every farrier can cut it out; but ordinarily the horfe muft be held faft by the head, and a needle with a ftrong double thread run through the middle of his upper eye-lid, which muft be held open by the thread's being tied to his head: a needle and thread fhould then be run through the haw, when cutting the fkin round with a fharp pen-knife, the haw may be plucked out. Then take the blood out of his eye, wafh it with beer or ale, and put in a good deal of falt; afterwards wafh it again, and ftroking it down with your hand, let him go.

Sheep are cured of this malady by droping into the eye the juice of chamomile or crow's foot.

Haw-finch, in ornithology, the englifh name of a bird, known among authors by the name coccothrauftes.

HAWK, a fynonymous term with falcon, though, by fome, reftrained to the leffer fort of falcons. See the articles Falcon and Falconry.

Others diftinguifh hawks into the long-winged and fhort-winged kinds: of the firft kind are the gentle-falcon, gerfalcon, lanner, faker, hobby, &c. See the article Gerfalcon, &c.

And of the fhort-winged kind are the gofhawk, fparrow-hawk, ftanyel, &c. See Goshawk, Sparrow hawk, &c.

Here it is to be obferved, that the female hawks, as well as all other birds of prey, being larger and more robuft than the males, are likewife more hardy, bold, and ferviceable.

HAWKER, in commerce, a pedlar, or perfon that goes about the country felling wares: this name is faid to arife from their uncertain wandering, like perfons who with hawks feek their game where they may find it.

Every hawker, &c. muft take a licence, for which he muft pay 4 l. and if with horfe, afs, or mule, for every one of them

them 4 l. a-piece: if he travels without, or contrary to his licence, he forfeits for every offence, to the informer and the poor of the pariſh where diſcovered, 12 l. If he travels with a forged licence, he forfeits 50 l. and if he refuſes to ſhew his licence 5 l.

The acts relating to hawkers do not extend to the makers of goods or their agents; to thoſe who ſell goods in fairs or markets; to the ſellers of fiſh, fruit, or other victuals; nor to the venders of acts of parliament, proclamations, forms of prayer, almanacs, books, and newspapers.

HAWKING, the exerciſe of taking wild-fowl by means of hawks.

The method of reclaiming, manning, and bringing up a hawk to this exerciſe, is called falconry. See Falconry.

As for the exerciſe itſelf, though at preſent much diſuſed, it furniſhes a great variety of terms ſtill retained in our language, as gleam, leaſh, pannel, quarry, train, ſeeling, *&c.*

When your hawk comes readily to the lure, a large pair of luring-bells are to be put upon her; and the more giddy-headed, and apt to rake out, your hawk is, the larger muſt the bells be. Having done this, and ſhe being ſharp-ſet, ride out in a fair morning, into ſome large field unencumbered with trees or wood, with your hawk on your fiſt; then having looſened her hood, whiſtle ſoftly to provoke her to fly, unhood her, and let her fly with her head into the wind, for by that means ſhe will be the better able to get upon the wing, and will naturally climb upwards, flying a circle. After ſhe has flown three or four turns, then lure her with your voice, caſting the lure about your head, having firſt tied a pullet to it; and if your falcon come in, and approach near you, caſt out the lure into the wind, and if ſhe ſtoop to it, reward her.

You will often find, that when ſhe flies from the fiſt, ſhe will take ſtand on the ground: this is a fault, which is very common with ſoar-falcons. To remedy this, fright her up with your wand; and when you have forced her to take a turn or two, take her down to the lure, and feed her. But if this does not do, then you muſt have in readineſs a duck ſealed, ſo that ſhe may ſee no way but backwards, and that will make her mount the higher. Hold this duck in your hand, by one of the wings near the body; then lure with the voice, to make the falcon turn her head, and when ſhe is at a reaſonable pitch, caſt your duck up juſt under her, when, if ſhe ſtrike, ſtoop, or truſs the duck, permit her to kill it, and reward her by giving her a reaſonable gorge. After you have practiſed this two or three times, your hawk will leave the ſtand, and delighted to be on the wing, will be very obedient.

It is not convenient, for the firſt or ſecond time, to ſhew your hawk large fowl; for it frequently happens, that they eſcape from the hawk, and ſhe not recovering them, rakes after them: this gives the falconer trouble, and frequently occaſions the loſs of the hawk. But if ſhe happens to purſue a fowl, and being unable to recover it, gives it over, and comes in again directly, then caſt out a ſealed duck, and if ſhe ſtoop and truſs it a-croſs the wings, permit her to take her pleaſure, rewarding her alſo with the heart, brains, tongue, and liver. But if you have not a quick duck, take her down with the dry lure, and let her plume a pullet and feed upon it. By this means a hawk will learn to give over a fowl that rakes out, and on hearing the falconer's lure, will make back again, and know the better how to hold in the head.

Some hawks have a diſdainful coyneſs, proceeding from their being high fed: ſuch a hawk muſt not be rewarded, tho' ſhe ſhould kill; but you may give her leave to plume a little, and then taking a ſheep's-heart cold, or the leg of a pullet, when the hawk is buſy in pluming, let either of them be conveyed into the body of the fowl, that it may ſavour of it; and when the hawk has eaten the heart, brains, and tongue of the fowl, take out what is incloſed, call her to your fiſt, and feed her with it: afterwards give her ſome of the feathers of the fowl's neck, to ſcower her, and make her caſt.

If your hawk be a ſtately high-flying one, ſhe ought not to take more than one flight in a morning; and if ſhe be made for the river, let her not fly more than twice: when ſhe is at the higheſt, take her down with your lure; and when ſhe has plumed and broken the fowl a little, feed her, by which means you will keep her a high-flyer, and fond of the lure.

HAWSER, in the ſea-language, a large rope, or a kind of ſmall cable, ſerving for various uſes a-board a ſhip, as to faſten the main and fore ſhrouds, to warp a ſhip

a ſhip as ſhe lies at anchor, and wind her up to it by a capſtan, &c. The hawſer of a man of war may ſerve for a cable to the ſheat-anchor of a ſmall ſhip.

HAWSES, in a ſhip, are two large holes under the bow, through which the cables run when ſhe lies at anchor. Thus the hawſe-pieces are the large pieces of timber in which theſe holes are made. Hawſe-bags, are bags of canvaſs made tapering, and ſtuffed full of ocham; which are generally allowed ſmall ſhips, to prevent the ſhip from waſhing in at theſe holes: and hawſe-plugs, are plugs to ſtop the hawſes, to prevent the water from waſhing into the manger.

There are alſo ſome terms in the ſea-language that have an immediate relation to the hawſes. As *a bold hawſe*, is when the holes are high above the water. *Freſh the hawſe*, or veer out more cable, is uſed when part of the cable that lies in the hawſe is fretted or chafed, and it is ordered that more cable may be veered out, ſo that another part of it may reſt in the hawſes. *Freſh the hawſe*, that is, lay new pieces upon the cable in the hawſes, to preſerve it from fretting. *Burning in the hawſe*, is when the cables endure a violent ſtreſs. *Clearing the hawſes*, is diſentangling two cables that come through different hawſes. *To ride hawſe-full*, is when in ſtreſs of weather the ſhip falls with her head deep in the ſea, ſo that the water runs in at the hawſes.

HAY, any kind of graſs, cut and dried, for the food of cattle.

The time of mowing graſs for hay, muſt be regulated according to its growth and ripeneſs; nothing being more prejudicial to the crop than mowing it too ſoon, becauſe the ſap is not then fully come out of the root, and when made into hay, it ſhrinks away to nothing. It muſt not, however, be let ſtand too long, till it have ſhed its ſeeds. When the tops of the graſs look brown, and begin to bend down, and the red honey-ſuckle flowers begin to wither, you may conclude it ripe for mowing.

As ſoon as your graſs is mowen, if there is plenty of it, and it be thick in the ſwath, the hay-makers ſhould follow the mowers, and ſpread the ſwaths (unleſs you fear wet,) which is called tedding of them. At night, make it into cocks; and next day, as ſoon as the dew is off the ground, ſpread it again, and turn it, that it may dry on the other ſide. In this manner it is to be ſpread, turned, and made into cocks at night, till fully dry; and in caſe the weather ſeems to threaten rain, it ſhould be made into larger cocks, whereby it will be ſecured from wet, tho' let ſtand a day or two. Where thick-leaved weeds are among the graſs, it will require more drying and turning than ordinary.

Mowing of land too often is a great prejudice to it, unleſs conſtantly renewed by land-floods or manure; ſo that where theſe conveniencies cannot be had, the lands ſhould be fed once in two or three years; feeding being as neceſſary for hay-ground, as fallowing is for corn-grounds.

Saint-foin HAY, is of ſeveral ſorts, which may be diſtinguiſhed by the following terms, *viz.* 1ſt. The virgin. 2dly. The bloſſomed. 3dly. The full-grown. And, 4thly. The threſhed hay. The firſt of theſe is beyond compariſon the beſt. It muſt be cut before the bloſſoms generally appear; for when it ſtands till it is full blown, the moſt ſpirituous and nouriſhing parts of its juice are ſpent, the ſap is much impoveriſhed, and the ſaint-foin can never recover that richneſs it had in its virgin-ſtate. But this fine hay cannot well be had of uncultivated ſaint-foin, becauſe that may not be much above an handful high when it is in a condition to be cut; it would then make a very light crop, and would be a great while before it ſprang up again: but the rich will have two or three tuns to an acre, and ſpring again immediately for a ſecond crop; ſo that little or none in quantity would be loſt by ſo great an improvement of its quality.

The ſecond ſort is that cut in the flower, which, tho' much inferior to the virgin-hay, far exceeds any other kind as yet commonly propagated in England; and if it be a full crop, it may amount to three tuns an acre. This is that ſaint-foin which is commonly made, and the larger it is, the more nouriſhing it is for horſes.

The next ſort of ſaint-foin is the full grown, cut when the bloſſoms are gone, or going off: this alſo is good hay, tho' it falls ſhort by many degrees of the goodneſs of the other two ſorts: but it makes a greater crop than either of them, becauſe it grows to its full bulk, and ſhrinks little in drying.

The laſt ſort is the threſhed hay, which when not damaged by wet weather, has been

been found more nourifhing to horfes than coarfe water-meadow hay; and, when it is cut fmall by an engine, is good for cattle, and much better than the chaff of corn. The beft time to cut it, is when the greateft part of the feed is well filled; the firft-blown ripe, and the laft-blown beginning to be full.

The goodnefs of the hay depends greatly upon the manner of ordering it. The beft hay in all England is made of faint-foin, without ever fpreading it. This method, though it be longer before it be finifhed, cofts lefs labour than the other. If faint-foin be laid up pretty green, it will take no damage, provided it be fet in fmall round ricks, with a large bafket drawn up in the middle of each, to have a vent-hole through which the fuperfluous moifture of the hay may tranfpire. As foon as its heating is over, thefe ricks ought to be thatched; and all faint-foin ricks, that are made when the hay is full dried in the cocks, ought to be thatched immediately after the making them. That which is laid up moft dried, will come out of the rick of a green colour; but that which has been much heated in the rick, will be brown.

The feed affords the owner another opportunity of making a profit of his faint-foin; but this, if the hoeing hufbandry were general, would not be vendible in great quantities for planting; becaufe the ordinary crop of an acre, will produce feed enough to drill an hundred acres, which would not want planting for a long time. The other ufe then of this feed is for provender; and it has been affirmed by fome, who have made trials of it, that three bufhels of good faint-foin feed given to horfes, will nourifh them as much as four bufhels of oats; and when well ordered, it is fo fweet, that moft forts of cattle are greedy of it.

HAY, in geography, a market-town in Brecknockfhire, South Wales, thirteen miles north-eaft of Brecknock.

HAY BOTE, in law, a liberty to take thorns, and other woods, to make and repair hedges, gates, fences, *&c.* by a tenant for life or years.

HAY BOTE is alfo taken for wood for the making of rakes and forks, ufed in making hay.

HAYLESHAM, a market-town of Suffex, fitu ted ten miles eaft of Lewes.

HAY-MARKET, a particular place in London, or its fuburbs, where hay is fold, and where all carts of hay that ftand to be fold there pay 3 d. per load towards paving the ftreets. The new hay fold in London, *&c.* between the firft of June and the laft of Auguft, ought to weigh fixty pounds a trufs; and old hay, the other part of the year, is to weigh fifty-fix pounds, the feller being liable to forfeit 2 s. 6 d. for every trufs under that weight.

HAYN, a town of Silefia, in the territory of Lignits, thirty-five miles north-weft of Breflaw: eaft longitude 16° 5′, north latitude 51° 17′.

HAYNAULT, a province of the Netherlands, bounded by Brabant and Flanders, on the north; by Namur and Liege, on the eaft; by the Cambrefis, Picardy, and Champaign, on the fouth; and by Artois, and another part of Flanders, on the weft: the north part is fubject to the houfe of Auftria, and the fouth part to France. Its capital is Mons.

HAYWARD, the perfon who keeps the common herd or cattle of a town.

He is appointed by the lord's court, and his office is to fee that the cattle neither break nor crop the hedges of inclofed grounds; he is alfo to look to the fields, and impound cattle that commit trefpafs therein.

HAZARD, a game on dice, without tables, is very properly fo called, fince it fpeedily makes a man, or undoes him.

It is played with only two dice; and as many may play at it as can ftand round the largeft round table.

Two things are chiefly to be obferved, *viz.* main and chance; the latter belonging to the cafter, and the former, or main, to the other gamefters. There can be no main thrown above nine, nor under five; fo that five, fix, feven, eight, and nine, are the only mains flung at hazard. Chances and nicks are from four to ten: thus four is a chance to nine, five to eight, fix to feven, feven to fix, eight to five; and nine and ten a chance to five, fix, feven, and eight: in fhort, four, five, fix, feven, eight, nine, and ten, are chances to any main, if any of thefe nick it not. Now nicks are either when the chance is the fame with the main, as five and five, or the like; or fix and twelve, feven and eleven, eight and twelve. Here obferve, that twelve is out to nine, feven, and five; eleven is out to nine, eight, fix, and five; and ames-ace and duce-ace, are out to all mains whatever.

But to illuftrate this game by a few examples:

amples: ſuppoſe the main to be ſeven, and the caſter throws five, which is his chance; he then throws again, and if five turn up, he wins all the money ſet him; but if ſeven is thrown, he muſt pay as much money as there is on the board: again, if ſeven be the main, and the caſter throws eleven, or a nick, he ſweeps away all the money on the table; but if he throws a chance, as in the firſt caſe, he muſt throw again: laſtly, if ſeven be the main, and the caſter throws ames-ace, duce-ace, or twelve, he is out; but if he throws from four to ten, he hath a chance; though they are accounted the worſt chances on the dice, as ſeven is reputed the beſt and eaſieſt main to be flung. Four and five are bad throws (the former of which being called by the tribe of nickers, little dick-fiſher) as having only two chances, *viz.* trey-ace and two duces, or trey duce and quater-ace: whereas ſeven hath three chances, *viz.* cinque duce, ſice-ace, and quater trey. Nine and ten are in the like condition with four and five; having only two chances. Six and eight have indeed the ſame number of chances with ſeven, *viz.* three; but experienced gameſters nevertheleſs prefer the ſeven, by reaſon of the difficulty to throw the doublets, two quaters, or two treys. It is alſo the opinion of moſt, that at the firſt throw, the caſter hath the worſt of it. On the whole, hazard is certainly one of the moſt bewitching and ruinous games played on the dice. Happy, therefore, the man who either never heard of it, or who has reſolution enough to leave it off in time. See the articles CHANCE and GAMING.

HAZLE, *corylus*, in botany. See the article CORYLUS.

Witch HAZLE, a name ſometimes given to the elm. See the article ELM.

HAZLE-EARTH, or HAZLEY EARTH, in agriculture, a kind of red loam, which is ſaid to be an excellent mixture with other ſorts of earth; uniting what is too looſe, cooling what is too hot, and gently entertaining the moiſture.

The beſt manure for a hazley ſoil is marl, chalk, and ſea-coal aſhes. See MARL, CHALK, and ASHES.

HAZLE-HEN, a bird of the ſize of a moderately grown pullet; it is a ſpecies of tetrao, with a grey tail, ſpotted and faſciated with black, frequent in many parts of Europe. See TETRAO.

HEA, a province of the empire of Morocco, ſituated on the ocean, ſouth-weſt of Morocco proper.

HEAD, *caput*, in anatomy, the uppermoſt part of the body of an animal.

The head is the firſt of the five diviſions into which anatomiſts diſtinguiſh the human body, conſiſting of the head, neck, thorax, abdomen, and extremities. See the article NECK, &c.

The firſt parts to be diſtinguiſhed in the head, are the hairy part, or ſcalp; and the naked part, of the face; after which we are to attend to the diviſion into the ſinciput and occiput, the fore and hinder part of the head; the temples, the crown, or vertex; the bucca, the cheeks, and the philtrum, or lacuna.

The coverings of the head are, firſt, the hair; ſecondly, the ſkin; thirdly, the membrana celluloſa; and, fourthly, the muſcles. See HAIR, CUTIS, &c.

Beſides the external integuments of the head, there is an aponeurotic expanſion which covers the head like a cap, and is ſpread round the neck, and on the ſhoulders, like a riding-hood; and for this reaſon Winſlow gives it the name of coif, and calls the ſuperior portion of it the aponeurotic cap.

The head contains in the cavity of the bones of the ſkull the chief organ, or primum mobile of the whole animal oeconomy; the face is the ſeat of ſeveral other particular organs, which are greatly compounded. The proper containing parts of the head are the frontal muſcles, the pericranium, and the bones of the ſkull: the parts contained are the membranes of the brain, the brain itſelf, and the veſſels. See the article BRAIN.

With regard to the bones of the head, it may be obſerved, that the head expreſſes that part of the ſkeleton which is placed upon the top vertebra of the neck, and in this view is divided into the cranium or ſkull, and maxillæ. See the articles SKULL and MAXILLA.

The whole head of the ſkeleton is ſpheroidical, compoſed as it were of two ovals a little depreſſed on each ſide: one of them is ſuperior, the extremities pointing forward and backward; the other is anterior, the extremity being turned upwards and downwards, in ſuch a manner as that one extremity of each oval meets, and is loſt in the other, at the place particularly known by the name of the forehead.

This complex figure being viewed ſideways, repreſents a ſpheroidical triangl

and we ought farther to obferve, that the oval of the fkull is broader behind than before, and that of the face broader above than below.

For the arteries and veins of the head, fee the articles ARTERY and VEIN.

For the glands and mufcles, fee the articles GLAND and MUSCLE.

Difeafes of the HEAD, are often miftaken, even by phyficians, for thofe of other parts. Some phyficians tell us, that thofe who are fubject to diforders of the head, ought not to take any food at night.

HEAD-ACH, a moft troublefome fenfation in the nervous membranes of the head, produced by various caufes, and attended with different fymptoms, according to its different degrees, and the place where it is feated.

The moft common feat of this difeafe is the pericranium. It may likewife be in the fkin that covers the fkull, and in the dura mater: this laft but feldom happens, but when it does it is very dangerous. There may likewife be a very acute pain in the thin membrane that covers the finus of the os frontis.

If the head-ach be flight, and affects a particular part of the head, it is called cephalalgia; if the whole, cephalæa; if one fide only, hemicrania; if there is a fixed pain on the top of the head which may be covered with the end of the thumb, it is called clavus hyftericus. The general caufe of the head-ach, according to Hoffman, is a hindrance of the free circulation of the blood through the veffels of the head.

When the blood rufhes with impetuofity, and in too great plenty into the membranes, which may happen to the plethoric, to thofe whofe ufual bleeding at the nofe is fuppreffed, and to young perfons, there is a pain in the whole head, which becomes hot, fwells, achs, and looks red; the veffels fwell, and there is a ftrong pulfation in thofe of the neck and temples. The noftrils are dry and parched; there is a burning heat, and drought in the fauces.

When the veffels of the head are ftuffed with a mucous ferum from a ftoppage of the running of the nofe, then there is a heavy obtufe preffing pain chiefly in the fore part of the head, in which there feems to be fuch a weight, that the patient can fcarce hold it up: fometimes the fkin is fo fwelled that it will pit; fometimes it happens from the ferous, fharp, cauftic matter of the french difeafe, which infefts the pericranium, and often caufes a caries in the fkull: fometimes it may proceed from matter of a faline, cauftic nature, driven back from the external parts, as in the gout, itch, eryfipelas of the head, gutta rofacea, the fmall-pox and meafles, before the morbid matter is expelled to the outward fkin, or, which is worfe, when it is driven back. In thefe cafes where a fmall quantity of cauftic matter caufes the pain, it rather proceeds from a violent ftricture of the membranes than from their diftention.

There is likewife a moft violent, fixed, conftant, and almoft intolerable head-ach, which brings on a debility both of body and mind, hinders fleep, difturbs digeftion, deftroys the appetite, caufes a vertigo, dimnefs of fight, blindnefs, a noife in the ears, convulfions, and the epilepfy; and by confent of the other nervous parts of the body, produces vomiting, coftivenefs, coldnefs of the extreme parts, and the countenance of a dying perfon.

Sometimes the head-ach is fymptomatic, and attends upon continual and intermitting fevers, and efpecially the quartan, irregular flowing of the menfes, the hypochondriac paffion, and the like. A hemicrania generally proceeds from a fault in the ftomach from crudities or indigeftion, and commonly appears when digeftion is performed.

The curative indications are, 1. To divert the impetus of the blood and humours from the head, and to difcufs them by fuitable remedies. 2. To relax the fpaftic ftrictures of the membranes, the caufe of which is a fharp cauftic matter, that the fluids may have a more free circulation. 3. To correct the peccant matter, and evacuate it gently through the moft convenient emunctories. 4. To prevent a return by ftrengthening the whole nervous fyftem, by proper remedies, and efpecially by an accurate diet and regimen.

When the blood rufhes to the head in too great quantity, bleeding is neceffary, more particularly under the tongue, in the forehead, in the jugulars, or by leeches behind the ears. If the body abounds with too much blood, it will be beft to bleed in the ancle firft, and the next day, or a day after, in a vein about the head. But firft of all cleanfe the body by an emollient

emollient clyſter, or by giving an infuſion of rhubarb and manna, with cream of tartar.

To reſtrain the orgaſm of the blood, it will be proper to give a diaphoretic and abſorbent mixture, with diaphoretic antimony, purified nitre, burnt hart's horn, and diacodium, diluted with a ſufficient quantity of ſuitable ſimple diſtilled waters. But if the head-ach proceeds from a copious vitiated ſerum ſtagnating in the membranes, either within or without the ſkull, with a dull heavy continual pain, which will neither yield to bleeding nor gentle laxatives, then more powerful remedies are required to diſſolve the thick glutinous humours, and to carry them off by ſtool.

Take of pure gum ammoniac, ſagapenum, the beſt myrrh, roſeated aloes, extract of black hellebore, reſin of jalap mercurius dulcis, and prepared cinnabar, each half a dram ; of the extract of ſaffron, of the powder of caſtor, and of the ſalt of amber, each fifteen grains. Make them into a maſs ; out of every ſcruple of which make twelve pills ; ſix of which may be taken at night, and the other ſix in the morning. On the day the pills are taken, let the patient take nothing but thin broths. After three days they may be repeated again : when the vitiated ſerum has been ſufficiently evacuated, then give ſtrengthening remedies mixt with diuretics ; at the ſame time the patient ſhould uſe exerciſe to make him ſweat, with ſtrong frictions, and ſuch aliment and liquors as tend to promote a diſcharge by urine. See DIURETICS.

If this method fails of ſucceſs, apply a bliſter made with an ounce of the emplaſtrum attrahens, and a dram of cantharides, adding a few grains of camphor. It may be of the ſize of a crown-piece, and applied to the nape of the neck ; it ſhould be often renewed, and continued for a long time. When the diſeaſe is evident to the ſight and touch, from the ſerum ſtagnating under the ſkin of the head, a bliſter may be laid all over the head, with great advantage. See the article VESICATORY.

When there is any intenſe pain remaining fixed in one place lying pretty deep in the membranes, the herb ranunculus uſed as a veſicatory, has a wonderful efficacy : the leaves muſt be bruiſed in a marble mortar, and the part, if hairy, ſhaved ; then a ſticking plaſter is to be laid on it, with a hole about the bigneſs of a ſilver-penny, and the leaves over that, juſt in the ſame manner as a cauſtic. See the article CAUSTIC.

If it is cauſed by a ſuppreſſion of a coryza, a ſmelling-bottle of volatile ſalts ſhould be held frequently to the noſe, or the patient may take herb ſnuff, with the addition of flowers of benjamin and powder of cloves. See CATARRH.

When the head-ach ariſes from a corrupted maſs of blood and an impure ſerum, as in the ſcurvy, and lues venerea, a decoction of the woods, with crude antimony, may be ſerviceable, after evacuations with the pills recommended above. Faſting a day now and then with labour and exerciſe, may be uſeful ; as alſo a ſudorific. See the articles EXERCISE and SUDORIFIC.

A hemicrania, eſpecially a periodical one, is generally owing to a foulneſs in the ſtomach, and primæ viæ, for which gentle emetics will be beneficial ; as alſo purgatives, to drive the humours from the head ; afterwards ſtomachics. If it proceeds from profuſe evacuations of the menſes or hæmorrhoids, thoſe fluxes muſt be reduced within bounds. See the article FLUX, *&c.*

If the head-ach is ſo intolerable as to endanger the patient's life, or is attended with continual watching, fainting fits, a fever, an inflammation, or a delirium, recourſe muſt be immediately had to opiates, with native cinnabar, after a clyſter has been firſt given. When there is an intolerable pain in the ſinuſes of the noſe, or the boney ſinuſes of the head, produced by an extravaſation of ſome fluid, the only cure is ſcarification of the noſtrils, or cauſing the noſe to bleed with a ſtraw ſuddenly thruſt therein. See the article EXTRAVASATION.

If there is an extravaſation under the pericranium, and the humour is ſo ſharp as to begin to render the bone carious, then recourſe muſt be had to inciſion, as in a whitlow. See WHITLOW.

If the head-ach ariſes from a ſudden orgaſm in the blood, proceeding from heat, exerciſe, or labour, evacuations of any kind are not proper, but rather cooling draughts with nitre.

HEAD-MOULD-SHOT, a diſorder affecting new-born infants, in which the edges of the bones of the cranium at the ſutures, eſpecially the coronal one, lie over one another, ſo that the fibres of the meninges are ſtretched, and torn aſunder, and the brain itſelf compreſſed ; whence con-

convulſions frequently happen that carry them off.

The head-mould-ſhot is a diſorder oppoſite to the horſe-ſhoe-head. See the article HORSE-SHOE-HEAD.

Ulcers and eruptions of the HEAD. There are ſeveral ulcers or eruptions, which the hairy part of the head is ſubject to, and which the writers in medicine have diſtinguiſhed by the ſeveral names of tineæ, favi, and achores, for the treatment and account of which, ſee the articles ACHOR and TINEA.

When the achor extends itſelf to the face, it is known by the name of cruſta lactea. See CRUSTA LACTEA.

For the wounds of the HEAD. See the articles WOUND, FISSURE, CONTRA-FISSURE, FRACTURE, TREPAN, *&c.* Mr. le Dran, in his obſervations on the wounds of the head, ſhews how much more dangerous the caſe is, when the cranium does not break by violent blows, *&c.* than when it is fractured, becauſe of the greater commotions of the brain, *&c.* and therefore concludes it neceſſary to perform the operation of the trepan oftener than is commonly practiſed.

HEAD is alſo uſed for the top or extremity of any thing; thus we ſay the head of a tree, the head of a bone, the head of a muſcle, the head of a nail, *&c.*

HEAD, in architecture, an ornament of carved work, or ſculpture, frequently ſerving as the key of an arch, or plat-band, on other occaſions.

Theſe ſort of heads uſually repreſent ſome of the heathen divinities, virtues, ſeaſons, ages, *&c.* with their attributes, as a thunderbolt for Jupiter, a diadem for Juno, a trident for Neptune, a crown of ears of corn for Ceres, a helmet for Mars, a caduceus for Mercury, *&c.*

The heads of beaſts are alſo uſed in places ſuitable, as an horſe's head for an equery; a deer's or boar's head, for a park or foreſt; a dog's head for a kennel; a bullock's or ſheep's, for a ſhambles or market houſe. In the metopes, friezes and other parts of certain antique doric temples, we ſee repreſentations of bullocks, or rams-heads, as a ſymbol of the ſacrifices offered there.

HEAD, in heraldry. The heads of men, beaſts, or birds, are very frequent in armoury, and borne either full-faced, looking forward, or ſide-faced in profile, when only one half of the face appears, which differences ought to be mentioned in blazoning, to avoid miſtakes; as a head, or heads fronting; or a head, or heads ſide-faced, or in profile: thus, Vert, a chevron gules, between three turks-heads couped ſide-faced proper, is borne by the name of Smith. And again, Or, a croſs gules, between four blackmoors heads, couped at the ſhoulders proper, is borne by the name Juxon. As the head is the principal part of the body, ſo it is of courſe the nobleſt bearing.

Among medaliſts, the different heads on antient coins, are diſtinguiſhed by the different dreſſes thereof. See MEDAL.

In the imperial medals, where the head is quite bare, it is uſually a ſign the perſon was not an emperor, but one of the children of an emperor, the preſumptive heir of the empire. The heads which are covered, are either covered with a diadem, or a crown, or a ſimple caſk, or a veil, with ſome other foreign covering; whereof the diadem is the moſt antient. The heads of deities are diſtinguiſhed by ſome ſpecial ſymbol thereof.

HEAD, among huntſmen, is uſed for the horns of a deer, as a hart, buck, *&c.* See ANTLER, CROCHES, *&c.*

HEAD, in the manege. Head of a horſe imports the action of his neck, and the effect of the bridle, and the wriſt: this horſe plants his head well, and obeys the hand; ſuch a horſe refuſes to place his head; he ſhoots out his noſe, and never reſts right on the hand, *&c.* For the properties of the head of a horſe. See HORSE.

HEAD *in and likewiſe the hips.* You muſt paſſage your horſe-head and croupe in, *i. e.* work him ſide-ways upon two parallel lines, at ſtep or trot, ſo that when the horſe makes a volt, his ſhoulders mark a piſte, or trade at the ſame time, that his haunches give the tract of another, and the horſe plying or bending his neck, turns his head a little within the volt, and ſo looks upon the ground he is to go over.

HEAD, in the military art. Head of a work is the front of it next the enemy, and fartheſt from the place, as the front of a hornwork is the diſtance between the flanked angles of the demibaſtions; the head of a double tenaille is the ſalliant angle in the middle; and the two other ſides which form the re-entering angles. See the article FRONT, *&c.*

HEAD, in painting, ſculpture, *&c.* a repreſentation of that part of the human body, whether in colours, draught, or creux: if taken from the life, or ſuppoſed to bear a juſt reſemblance to the perſon,

person, it is more properly called portrait. See the article PORTRAIT.

HEAD BOROW, the person who is chief of the frank-pledge in boroughs, or who antiently had the government within his own pledge. See FRANK-PLEDGE.

HEAD-BOROWS, at this time, are a kind of constables. See CONSTABLE.

HEAD-FARCIN. See the article FARCIN.

HEAD-LAND, in husbandry, is taken to signify the upper part of land left for the turning of the plough.

HEAD-LINES, in a ship, those ropes of all sails which are next to the yards, and by which the sails are made fast to the yard. See SAIL and YARD.

HEAD-PENCE, a certain sum antiently collected by the sheriff of Northumberland, of the inhabitants of that county, without any account to be given thereof to the king, which exaction was abolished by Hen. VI.

HEAD-SEA, is when a great wave or billow of the sea comes right a-head of the ship, as she is in her course.

HEAD-SAILS, in a ship, those which belong to the fore-mast, and boltsprit: for it is by these that the head of the ship is governed, and made to fall off and keep out of the wind; and these in quarter-winds are the chief drawing sails.

HEAD-SILVER, a fine paid to the lords of the leet.

HEAD STALL, in the manege. See the article CAVEZON.

HEAD-STALL, among musicians. See the article PHORBÆA.

HEAD-TIN, in metallurgy, a preparation of tin-ore towards the fitting it for working into metal. When the ore has been pounded and twice washed, that part of it which lies uppermost, or makes the surface of the mass in the tub, is called head-tin: this is separated from the rest, and after a little more washing becomes fit for the blowing-house.

HEAD *of a ship*, or other vessel, is the prow, or that part which goes foremost.

Moor's HEAD is understood of a horse with a black head and feet; the body being usually of a roan colour. Among engineers a moor's head is used for a kind of bomb or granado shot out of a cannon. Among chemists it is a cover, or capital, of an alembic; having a long neck to convey the vapours raised by the fire into a vessel, which serves as a refrigeratory. See ALEMBIC.

Dragon's HEAD, in astronomy, *&c.* is the ascending node of the moon, or other planet. See the article NODE.

HEADS, a term used by builders for that kind of tyle which they use to lay at the eaves of a house; being the full breadth of a common tyle, and but half a tyle in length. See the article TYLE.

HEADFORD, a town of Galway, in Ireland, twelves miles north of the city of Galway.

HEALING, is used, by surgeons, for the curing of wounds, ulcers, and other sores. See the articles WOUND, ULCER, TUMOUR, *&c.*

HEALING, in architecture, the covering a roof with lead, tyles, slate, or the like.

HEALTH, is a right disposition of the body, and of all its parts; consisting in a due temperature, a right conformation, just connection, and ready and free exercise of the several vital functions.

Health admits of latitude, as not being the same in all subjects, who may yet be said to enjoy health.

That part of medicine, which shews the means of preserving health, is termed hygieine. See the article HYGIEINE.

The Greeks and Romans deified health, representing it under the figure of a woman, whom they supposed to be the daughter of Æsculapius. We find the name of the goddess Salus, or health, on many medals of the roman emperors, with different inscriptions, as SALUS PUBLICA, SALUS REIPUBLICÆ, SALUS AUGUSTI, *&c.*

HEAM, in beasts, is the same with the secundines, or after-birth in women.

The medicines proper to expel it, are thyme, winter-savoury, and penny-royal, boiled in white wine and given inwardly; as also common hore-hound stewed in white wine. Dittany, put up in form of a pessary, drives out a dead foal, and brings away the secundines. Angelica produces the same effect; so does parsley-seed, alexanders, hops, fennel, savin, and bay-berries.

HEAN, a town of Tonquin, in the farther India, situated on the river Domea, eighty miles north of the bay of Tonquin: east long 107°, north lat. 22°.

HEARING, *auditus*, the sense whereby we perceive sounds. See SOUND.

The organ of hearing is the ear, and particularly the auditory nerve and membrane. See the article EAR.

This membrane, in the various degrees of tension and relaxation, adapts itself

to

to the ſeveral natures and ſtates of ſonorous bodies; becoming tenſe for the reception of acute ſounds, and relaxed for the admiſſion of grave ſounds. In ſhort, it is rendered tenſe and relaxed in a thouſand different degrees, according to the various degrees of acuteneſs or gravity in ſounds.

Sound, then, is in effect nothing but a certain modulation of the air, which being collected by the external ear, paſſes thro' the meatus auditorius, and beats upon the membrane of the tympanum, which moves the bones in the tympanum: theſe move the internal air, which finally communicates the motion to the auditory nerve, in the labyrinth and cochlea; and according as the vibrations are quick or ſlow, the ſound is either acute or grave.

The curious ſtructure of the labyrinth and cochlea, ſerves to make the weakeſt ſounds audible; for the whole organ of hearing being included in a ſmall ſpace, the impreſſion would have been made only on a very ſmall part of it, had the auditory nerve run in a ſtraight line; and the ſtrength of the impreſſion being, cæteris paribus, always as the number of parts upon which the impreſſion is made, thoſe ſounds which are now low, could not have been heard at all. If, like the retina, the auditory nerve had been expanded into a large web, that had covered or lined ſome wide cavity, even in this caſe the impreſſion of ſounds had been much weaker than they are now: for this large cavity would have given room for the ſounds to dilate, and all ſounds grow weaker in proportion as they dilate: but in the preſent ſtructure of the labyrinth and cochlea, both theſe inconveniencies are prevented; the canals of which, by their winding, contain large portions of the auditory nerve; upon every point of which, the ſmalleſt ſound being once impreſt, becomes audible; the ſounds are hindered from dilating, by their narrowneſs; and the impreſſions that are made upon the nerves, by the firſt dilatation, are ever the ſtrongeſt. In like manner, the ſtrength of the impreſſion is increaſed in the narrow canals, by means of the elaſticity of the ſides of the bony canal; which receiving the firſt and ſtrongeſt impulſes of the air, reverberate them the more ſtrongly upon the auditory nerve.

It deſerves obſervation that though the air be the uſual matter of ſounds; ſo that if a bell be hung in vacuo, it will not be heard at all; yet moſt other bodies, properly diſpoſed, will do its office, only ſome more faintly than others. Thus a ſound may be heard through water, or even through earth, of which there are various inſtances.

As the ſight is aſſiſted by ſpectacles, or other glaſſes, ſo the hearing is enlivened and rendered quick, by means of acouſtic inſtruments; which are of various figures, but for the moſt part bear ſome reſemblance to a trumpet, diverging and growing wider towards the external mouth, marked B B, (plate CXXVI. fig. 3. n° 1.) the ſlender part A being introduced into the ear. But beſides this common kind, thoſe repreſented *ibid.* n° 2 and 3, are highly commended; but eſpecially the third one, which by reaſon of its ſmallneſs, and form, being wreathed up like a ſpiral ſhell, may be ſo concealed under one's hair or wig, as ſcarce to be obſervable; whilſt the ſlender part A is introduced into the ear, and the cords B B tied round it.

However, it is to be obſerved, that the ſimple kind almoſt in the ſhape of a horn, (*ibid.* n° 1.) and made either of braſs, ſilver, *&c.* is the beſt inſtrument hitherto invented for aſſiſting the hearing.

Dulneſs of HEARING. See the articles DEAFNESS and EAR.

Some recommend the following medicine for dulneſs of hearing: Take eſſence of amber, a dram; caſtor and oil of chamæmile, of each half a ſcruple; and oil of amber, one drop: mix them all together, and three or four times a day put a piece of cotton wetted in the mixture, into the ear.

The drinking of mineral waters every ſpring in a regular manner, is alſo recommended as a preſervative from this diſorder.

HEARSE, among ſportſmen, a hind of the ſecond year of her age. See HIND.

HEART, *cor*, in anatomy, a muſcular body, included in the pericardium, and ſituated nearly in the middle of the breaſt, between the lobes of the lungs; being the primary organ of the circulation of the blood, and conſequently of life.

Its figure is nearly conic, the larger end being called its baſe, and the ſmaller end its apex. Its lower part is plane, and the upper part convex. Its ſituation is nearly tranſverſe, or horizontal; ſo that its baſe is in the right, and its apex, with the greateſt part of its bulk, is in the left ſide of the thorax; and conſequently,

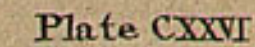


Fig. 1. The HARE.

Fig. 2. HATCHEL.

Fig. 3. HEARING.

B

No. 1.

B

B A B

No. 3.

No. 2.

B

A

Fig. 4. HASTATED LEAF.

J. Jefferys sculp.

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SEVILLA

quently, it is there that the pulsation is felt.

The plane surface of the heart lies on the diaphragm; the convex one is turned upwards. The heart is connected, 1st, by the intervention of the pericardium with the mediastinum, and with a large part of the middle of the diaphragm: this is contrived by nature, to prevent its being displaced, inverted, or turned too rudely about, in consequence of the various motions of the body. 2. Its base is connected to its common vessels; but its apex is free, and is received into a kind of cavity in the left lobe of the lungs.

The length of the human heart is about six fingers breadth: its breadth at the base, is about five fingers; and its circumference about thirteen. It is, both externally and internally, surrounded with a smooth membrane. There is a quantity of fat about it, which covers its base and its apex, and serves for lubricating it, and for facilitating its motions. Its blood-vessels are of two kinds, common and proper; its common or peculiar vessels being the coronary arteries and veins.

The common vessels of the heart are two veins, called the vena cava, and the vena pulmonalis; and two arteries, the pulmonary one, and aorta. The nerves of the heart are small, and arise from the par vagum and intercostals. The auricles are two. See VEIN, ARTERY, &c.

There are also two cavities in the heart, called its ventricles: of these the right is thinner and weaker in its circumference, but usually much more capacious than the left: it receives the blood from the vena cava, and the right auricle, and delivers it into the pulmonary artery, to be carried to the lungs. The left ventricle is much stronger and thicker in its sides; but it is narrower and smaller than the right: it receives the blood from the pulmonary vein, and the left auricle, and extrudes it very forcibly into the aorta. The right ventricle is in the anterior part of the thorax; the left in the hinder part: so that they might be called the anterior and posterior ventricles, much more properly than the right and left. See CIRCULATION.

There are in the sides of both the ventricles of the heart, and of both its auricles, several columnæ carneæ, or lacertuli, with furrows between them, seeming so many small and distinct muscles; and from the concourse of the tendinous fibres of these in the heart, there are formed peculiar membranes situated at the orifices of the auricles of the heart: and there are also other columns of this kind, which run transversely from one side of the ventricles to the other: these serve partly to assist the contraction of the heart in its systole, and partly to prevent its too great dilatation in its diastole. See the articles SYSTOLE and DIASTOLE.

The valvulæ of the heart are of three kinds. 1. The tricuspidales: these are three in number, and are situated at the ingress of the vena cava in the right ventricle. 2. The mitrales: these are two, and are situated in the left ventricle at the ingress of the pulmonary vein: these serve to hinder the ingress of the blood from the heart into the veins again, while they are constricted. 3. The semilunar ones: these are three, and are situated at the origin of the aorta and pulmonary artery, and serve to prevent the reflux of the blood from them into the heart: these, for the sake of strength, are furnished with a number of fleshy fibres and spheroide corpuscles.

The orifices of the veins of Thebesius and Verheyen, in the hollows of the heart, are for carrying back the blood from the substance of the heart to its cavities.

The fibres of the heart are of a muscular substance, and of a most amazing fabric. They are of two kinds, 1. Straight ones, in the left ventricle; and, 2. Spiral ones, common to both ventricles, and of two orders. The exterior ones run to the left, from the base of the heart: the interior ones run to the right, and intersect the others; and when they act, they closely constringe the cavities of the heart, and drive out the blood from them. According to this fabric, the heart may be resolved into two muscles, each of which constitutes one of its ventricles.

The use of the heart, is for the circulation of the blood. It receives the blood from the veins, running from all parts of the body; and propels it again, by its own motion, to all those parts through the arteries. On this depend life itself, the preservation of the frame, and the motions and actions of all its parts. See the article CIRCULATION *of the blood.*

This motion of the heart is wonderful: it continues to the utmost period of life, day and night, without a single moment's interruption or intermission; and is performed more than an hundred thousand

times every day. Here is, indeed, ſomething like what the mechaniſts want, under the name of a perpetual motion; and the ſtupendous wiſdom of the Creator is, in nothing, expreſſed more glorioufly.

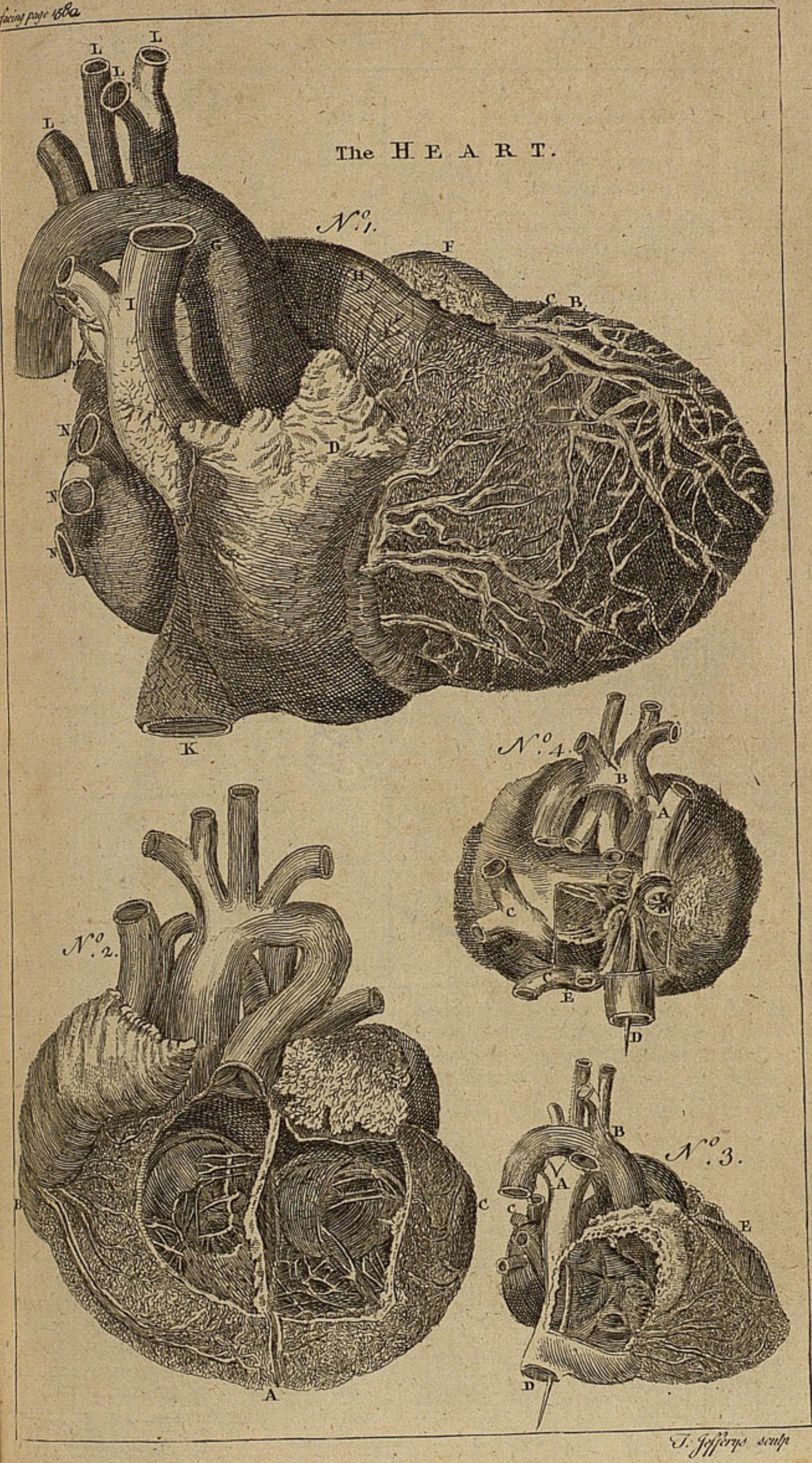
But that the reader may have as diſtinct an idea as poſſible of this primary organ of life, we ſhall lay before him ſeveral views of it. That exhibited in plate CXXVII. n° 1, repreſents the human heart ſeen in its convex part, and in its natural ſituation; where B marks the branches of the coronary vein; C, the coronary artery; D, the right auricle; E, branches of veins going from the right auricle; G, the trunk of the aorta; H, the trunk of the pulmonary artery; I, the aſcending trunk of the vena cava; K, the deſcending trunk of the vena cava; L, L, *&c.* branches of the aorta, riſing upwards; M, one of the branches of the pulmonary artery; N, N, *&c.* branches of the pulmonary vein. N° 2. *ibid.* repreſents the heart opened, to ſhew the ſtructure and form of its ventricles; where A expreſſes the muſcular ſeptum, or partition, which divides the ventricles; B, the right ventricle opening into the right auricle, and into the trunk of the pulmonary artery; C, the left ventricle, opening into the left auricle, and into the great trunk of the aorta. N° 3 and n° 4, *ibid.* repreſent the heart in different poſitions; where A marks the aſcending trunk of the vena cava; B the trunk of the aorta, C branches of the pulmonary vein, D the deſcending trunk of the vena cava, and E part of the right auricle, cut away to ſhew the different arrangement of the internal fibres and venous ducts.

Force of the HEART. Several ingenious perſons have, from time to time, attempted to make eſtimates of the force of the blood in the heart and arteries; who have as widely differed from each other, as they have from the truth, for want of a ſufficient number of data to argue from. This ſet the truly ingenious Dr. Hales upon making proper experiments, in order to aſcertain the force of the blood in the veins and arteries of ſeveral animals.

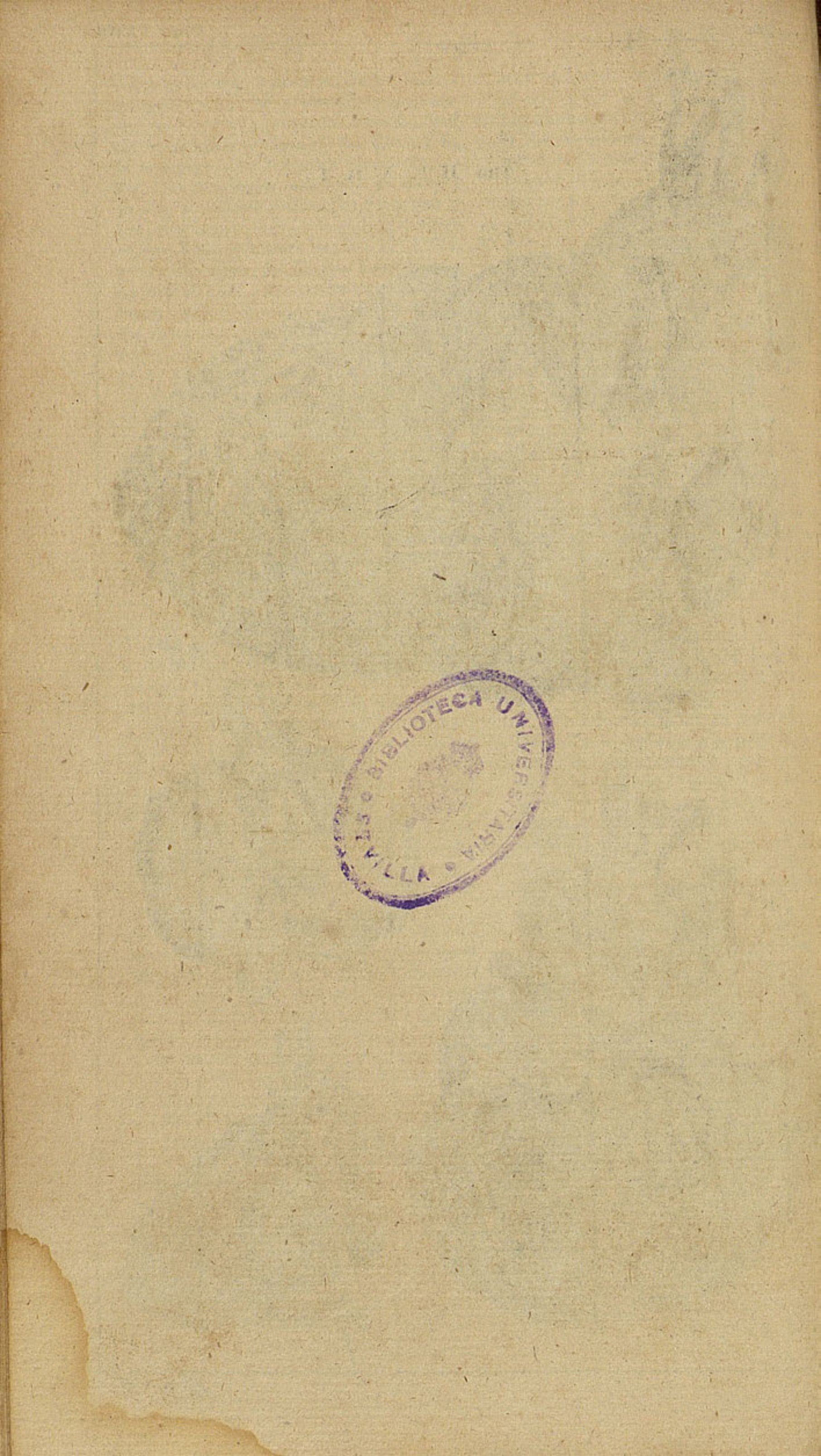
If, according to Dr. Keil's eſtimate, the left ventricle of a man's heart throw out in each ſyſtole an ounce, or 1.638 cubic inch of blood, and the area of the orifice of the aorta be = 0.4187; then dividing the former by this, the quotient 3.9 is the length of the cylinder of blood, which is formed in paſſing thro' the aorta in each ſyſtole of the ventricle; and in the ſeventy-five pulſes of a minute, a cylinder of 292.5 inches in length will paſs: this is at the rate of 1462 feet in an hour. But the ſyſtole of the heart being performed in one third of this time, the velocity of the blood in that inſtant will be thrice as much, *viz.* at the rate of 4386 feet in an hour, or 73 feet in a minute. And if the ventricle throws out one ounce in a pulſe; then in the ſeventy-five pulſes of a minute, the quantity of blood will be equal to 4.4 lb. 11 oz. and in thirty-four minutes a quantity equal to a middle-ſized man, *viz.* 158 lb. will paſs through the heart. But if, with Dr. Harvey, and Dr. Lower, we ſuppoſe two ounces of blood, that is, 3.276 cubic inches, to be thrown out at each ſyſtole of the ventricle, then the velocity of the blood in entering the orifice of the aorta, will be double the former, *viz.* at the rate of 146 feet in a minute, and a quantity of blood equal to the weight of a man's body will paſs in half the time, *viz.* 17 minutes.

If we ſuppoſe, what is probable, that the blood would riſe $7 + \frac{1}{2}$ feet high in a tube fixed to the carotide artery of a man, and that the inward area of the left ventricle of his heart, is equal to fifteen ſquare inches; theſe multiplied into $7+\frac{1}{2}$ feet give 1350 cubic inches of blood, which preſſes on that ventricle, when firſt it begins to contract, a weight equal to 51.5 pounds.

What the doctor thus calculates, from ſuppoſition, with regard to mankind, he actually experimented upon horſes, dogs, fallow does, *&c.* by fixing tubes, in orifices opened in their veins and arteries; by obſerving the ſeveral heights, to which the blood roſe in theſe tubes, as they lay on the ground; and by meaſuring the capacities of the ventricles of the heart, and orifices of the arteries. And that the reader may the more readily compare the ſaid eſtimates together, he has given a table of them, ranged in the following order.



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The several animals.	Weight of each.	Height of the blood in the tube from the jugular vein.	Height of the blood in tubes fixed to arteries.	Capacity of the left ventricle of the heart.	Area of the orifice of the aorta.	Velocity of the blood in the aorta.	Quantities of blood equal to the wt. of the animal in what time.	How much in a minute	Weight of the blood sustained by the left ventricle contracting	No of pulses in a min.	Area of transv. section of descending aorta	Area of the transverse section of ascending aorta.
	Pounds. Ounces.	Inches.	Feet. Inches.	Cubic inches.	Square inches.	Feet and inches in a minute.	Minutes.	Pounds.	Pounds.		Square inches.	Square inches.
Man	160	On strain-	7 6	1.659	0.4187	56.55	34.18	4.38	51.5	75		
		ing.		3.318		113.3	17 6	9.36				
Horse 1st.			8 3									
2d.			9 8									
3d.	825	12 52	9 6	10	1.036	86.85	60	13.75	113.22	36	0.677	0.369
Ox	1600			12.5	1.539	76.95	88	18.14		38	0.912	0.85
												right. left
Sheep	91	5½ 9	6 5½	1.85	0.172	174.5	20	4.593	36.56	65	0.094	0.07 0.012
Doe			4 2	9	0.476						0.383	0.246
												right. left
Dogs 1st.	52	0 6	6 8	1.172	0.196	144.77	11.9	4.34	33.61	97	0.106	0.041 0.034
2d.	24	5 7	2 8	1	0.185	130.9	6.48	3.7			0.102	0.031 0.009
3d.	18	5	4 8	0.633	0.118	130	7.8	2.3	19.8		0.07	0.022 0.009
4th.	12 5	4	3 3	0.5	0.101	120	6.7	1.85	11.1		0.061	0.015 0.007

Dr. Jurin likewise deduces the force of the heart from the laws of hydraulics, in the following manner. He supposes $p =$ to the weight of the left ventricle, or a quantity of blood equal to the same weight; $S =$ the internal surface of the same; $l =$ the mean length of the filaments of blood issuing from the same; $s =$ the section of the aorta; $q =$ the quantity of blood contained in the left ventricle; $t =$ the time in which the blood would be expelled from the heart, taking away the resistance of the arteries, and of the blood going before; $v =$ the variable velocity with which the blood issuing from the heart would flow through the aorta, abstracting from the resistance; $x =$ the variable length of the aorta, described by the blood gushing from the heart; $z =$ the time in which the length x is described. Hence the mean variable velocity of the blood contiguous to the ventricle, or the mean velocity of the ventricle itself, is $= \frac{sv}{S}$; the motion of the ventricle $= p \times \frac{sv}{S}$; the motion of the issuing of the blood $= sv \times \overline{l + x}$; the sum of these, or the power of the ventricle $= sv \times \overline{\frac{p}{S} + l + x}$. But it is $v = \frac{\dot{x}}{\dot{z}}$. Whence by Newton's inverse method of fluxions, the power of the ventricle will be found $\frac{s\dot{x}}{\dot{z}} \times \overline{\frac{p}{S} + \frac{x}{z} + l}$. Now,

Now, ſince $z = t$, it will be $sx = q$. Hence the power of the ventricle $= \frac{q}{t} \times \overline{\frac{p}{S} + \frac{q}{2s}} + l$. In the ſame manner the power of the right ventricle will be found $= \frac{q}{t} \times \overline{\frac{\pi}{\Sigma} + \frac{q}{2\sigma}} + \lambda$. Here the ſame things are ſignified by the greek letters in the right ventricle, as by the italic letters in the left. Hence the whole power of the heart $= \frac{q}{t} \times \overline{\frac{p}{S} + \frac{\pi}{\Sigma}} + \overline{\frac{q}{2s} + \frac{q}{2\sigma}} + l + \lambda$ Q. E. I.

If we ſuppoſe $p = 8$ ounces avoirdupois $= 13.128$ cubic inches; $\pi = 4 = 6.564$; $S = 10$ ſquare inches; $\Sigma = 10$; $l = 2$ inches; $\lambda = 1\frac{1}{2}$; $q = 2$ ounces avoirdupois $= 3.282$ cubic inches; $s = 0.4185$ ſquare inches; $\sigma = 0.583$; $t = 0.\ 1''$. The power of the ventricles will be equal to the motion of the underwritten weights, that is,

	lb	oz.
Of the left ventricle	9	1
Of the right ventricle	6	3
Of the whole heart	15	4

Of which weights the velocity will be ſuch, as that a line of an inch long might be deſcribed by the ſame in a ſecond.

Weight, &c. of the HEARTS of children, compared with thoſe of grown perſons. Dr. Bryan Robinſon has made ſeveral uſeful obſervations on this ſubject, which are as follow.

1. The weight of the heart with reſpect to the weight of the body, is greater in children than in grown perſons, in proportion of 3 to 2. Hence the weight of the heart, with reſpect to the weight of the body, leſſens continually from the birth, till the bodies come to their full growth.

2. The quantity of blood which flows through the heart or lungs in a given time, in proportion to the weight of the heart, or quantity of blood contained in the body, which quantity of blood is proportional to the weight of the heart, is greater in children than in grown bodies, in the proportion of 20 to 7; which is the proportion of their pulſes in a minute. Hence the quantity of blood that flows through the heart or lungs in a given time, in proportion to the whole quantity of blood contained in the body, leſſens continually from the birth, till bodies arrive at their full growth.

3. The velocity of the blood with reſpect to its quantity, which quantity is as the weight of the heart, is much greater in children, than in grown perſons, in the proportion of 80 to 7. Hence, tho' the blood of children moves ſlower than the blood of grown people; yet for its quantity, it moves much quicker, and paſſes much oftner thro' the lungs. On which account the blood of children, notwithſtanding the ſlowneſs of its motion, may by paſſing oftner through the lungs, and thereby receiving more of the acid of the air, in proportion to its quantity, be more fluid, and of a brighter colour, than the blood of grown perſons.

4. The quantity of blood that flows through the heart or lungs in a given time, in proportion to the weight of the body, is greater in children than in grown bodies, in the proportion of 30 to 7. Hence, though the velocity of the blood is leſs in children than in grown bodies, yet its motion with reſpect to the weight of the body is greater.

5. The velocity of the blood with reſpect to the length of body, is greater in children than in grown bodies, in the proportion of 20 to 7, which is the proportion of their pulſes in a minute. Hence the velocity of the blood and number of pulſes in a minute, with reſpect to the length of the body, leſſen continually in growing perſons, till they arrive at their full growth.

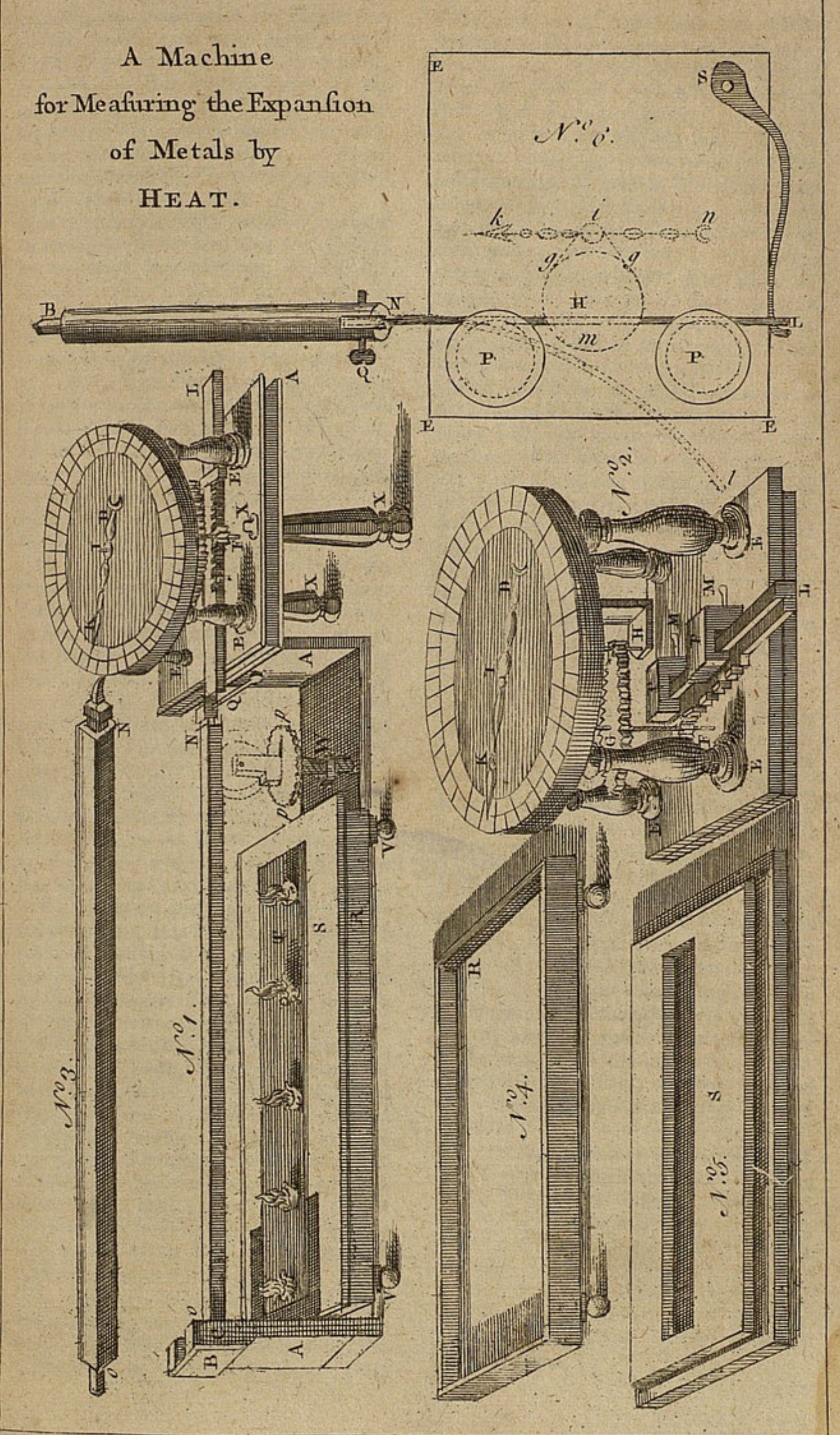
HEART-BURN, *cardialgia*, in medicine. See the articles CARDIALGIA and SODA.

HEART, in the manege. A horſe that works in the manege with conſtraint and irreſolution, and cannot be brought to conſent to it, is ſaid to be a horſe of two hearts.

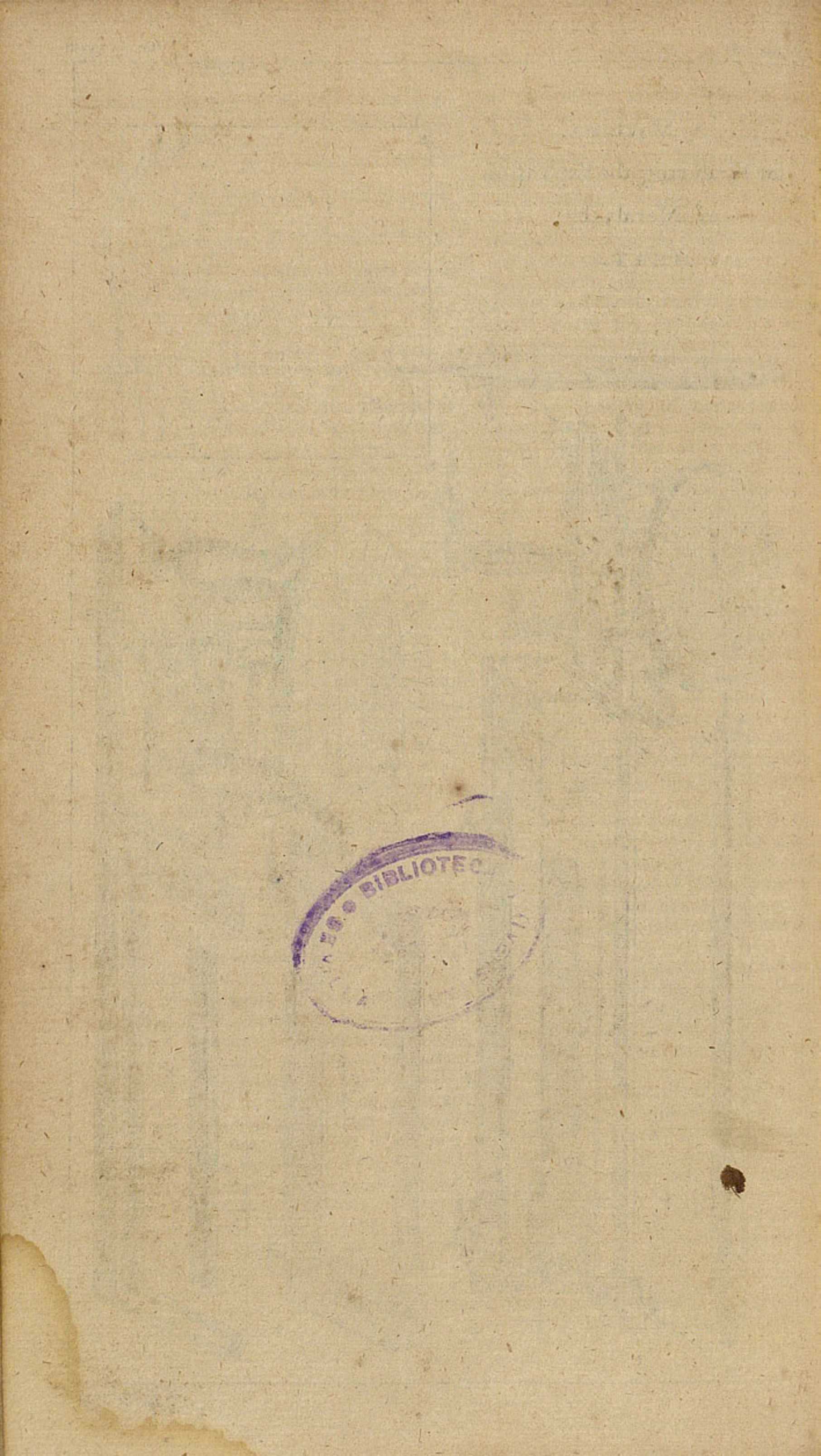
HEART SHELL, a name given to two different ſpecies of the cardia. Thus 1. The elegant, compreſſed, and marginated heart-ſhell, or heart-cockle, is an extremely tender and delicate ſpecies, about an inch and a quarter in length, and an inch in diameter. 2. The ſharp-backed cardia, with elegant variegations, commonly called the Venus heart-ſhell, much of the ſame ſtructure, delicacy, and variety of colouring with the former. See the article CARDIA.

HEAT, in phyſiology, one of the ſecondary qualities of bodies, produced by fire, and oppoſed to cold. See COLD.

Under the article fire, we conſidered the ſun as the principal ſource of heat upon the earth's ſurface, and the confines of the



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the earth and atmoſphere: without this all the bodies upon our globe would doubtleſs grow rigid, lifeleſs, and fixed. It is this that ſtirs within them, as the main ſpring of their actions. Hence vegetation and animalization are evidently promoted; and hence the ocean and the atmoſphere continue in a fluid ſtate. See VEGETATION.

Heat in us is properly a ſenſation, excited by the action of fire; or it is the effect of fire on our organs of feeling. See FIRE. Hence it follows, that what we call heat is a particular idea or modification of our own mind, and not any thing exiſting in that form in the body that occaſions it. Heat, ſays Mr. Locke, is no more in the fire that burns the finger, than pain is in the needle that pricks it. In effect, heat in the body that gives it, is only motion; and in the mind, only a particular idea or diſpoſition of the ſoul.

Heat in the hot body, according to 'S Graveſande, is an agitation of the parts of the body, made by means of the fire contained in it: by ſuch an agitation a motion is produced in our bodies, which excites the idea of heat in our mind; ſo that heat in reſpect of us is nothing but that idea, and in the hot body nothing but motion. If ſuch motion expel the fire in right lines, it gives us the idea of light; if in a various and irregular motion, only heat. See LIGHT.

Heat, with reſpect to our ſenſations, or the effect produced on us by a hot body, is eſtimated by its relation to the organ of feeling; no object appearing to be hot, unleſs its heat exceed that of our body. Whence the ſame thing to different perſons, or, at different times, to the ſame perſon, ſhall appear both hot and cold. The degree of heat is meaſured by the expanſion of the air, or ſpirit in the thermometer. See THERMOMETER.

Under the article FIRE, we conſidered, among the ſeveral other properties of heat, its quality of expanding and dilating bodies. It is found to expand metals conſiderably, as appears from an experiment of Muſchenbroek; the effects of which experiment are digeſted in a table, which having the degrees of expanſion marked in equal parts to the $\frac{1}{12500}$ part of an inch, we have given under the article EXPANSION.

The ingenious Muſchenbroek contrived a machine for meaſuring the leaſt alteration of dimenſions in metals by heat, the deſcription of which is this: plate CXXVIII. nº 1. repreſents the whole machine with all its parts together, as it is uſed. At one end of this is a braſs machine, L E, *&c.* which for the better ſhewing its parts is delineated, (*ibid.* nº 2.) as ſeen from another ſide. D is a circular plate $2\frac{1}{10}$ inches diameter, the circumference of which is divided into degrees: this plate ſtands upon four pillars E E E E, which join it to the lower braſs plate; and between the two plates, there is a perpendicular ſteel arbor or axis F, which has on its lower part a pinion of ſix leaves or teeth, and on its upper end a wheel of ſixty teeth, marked G: there is alſo another axis I H, ſupported by a cock H, which comes down from the upper plate; ſerving to turn the index I K, and having at its lower end a pinion of ſix leaves to take the teeth of the wheel G, by one turn of which wheel the index is carried round all the diviſions: L is a rack, or ſtraight piece of metal with teeth, which take the leaves of the pinion F, while it ſlides along under two ſmall cocks P P; being preſſed towards the pinion F by means of two ſcrews, M, M; or drawn from it as there is occaſion: there are twenty-five teeth in each inch of this piece; and as it moves foreward and backward, the pinion F is carried round, and conſequently the wheel G, which carries round the pinion H, together with the index I K. Let us ſuppoſe the rack to have run the length of an inch, then F and G will have turned round $4\frac{1}{6}$ times; and conſequently, the pinion H will have gone round $10 \times 4\frac{1}{6} = 41\frac{2}{3}$ times, becauſe H turns round ten times for G once: ſo that the index I K will have moved round $41\frac{2}{3}$ times, or 12500 degrees; therefore, when the index goes but from one degree to another, the rack L moves but the 12500th part of an inch; and as the motion of the index over half a degree is very ſenſible, we may perceive when the rack has moved $\frac{1}{25000}$ part of an inch.

Nº 3, *ibid.* repreſents a ſquare bar of metal, upon which the experiment is made, $5\frac{8}{10}$ inches long, and $\frac{3}{10}$ of an inch thick. Its end *O* has a ſmall tail, that it may communicate no heat to the iron plate A, into which it is received at B (*ibid.* nº 1.) and fixed by a ſcrew C. Its other end N has a hole in it, thro' which goes the ſcrew Q, that makes it faſt to the rack L.

The

The bar being thus fixed, cannot become longer without pushing forward the rack L, and thereby moving round the index I K, by means of the wheel and pinions F, G, H; so likewise when it grows shorter, they must move the contrary way.

Now in order to apply the heat of burning spirits, there is a box, R, made of brass (*ibid.* n° 4.) $3\frac{1}{2}$ inches long, $1\frac{2}{10}$ inch wide, and $\frac{4}{10}$ inch deep; which is covered at top with a piece of stone, S, represented in n° 5. with the under-side uppermost, the use of which is, to prevent the spirits from taking fire. It has a long hole cut thro' the middle, into which is let a brass plate T, (*ibid.* n° 1.) with five small equidistant holes, to transmit so many wicks of fine cotton; which being lighted, one or more at a time, cause the bar to expand, and the degree whereof is shewn by the index.

N° 6. represents the lower frame with Dr. Desaguliers's alterations, where B N is the round rod of metal to be tried with the steel-plate made fast at N by the pin Q. This plate, the natural situation of which is N *l*, is here kept straight in the position N L, by means of the spring S L; and is directed by the grooves of the pullies P P, so that its upper-side presses on the roller H. The dotted circles *mgg*, represent the wheel above on the axis of H; and *gig*, the watch-chain, carrying round the last roller *i*, an index *nik*, as in n° 1.

It has been justly observed by some of our modern philosophers, that actual or absolute heat, is to sensible or relative heat, the same as motion is to velocity: for absolute heat is nothing but the whole motion of all the parts of the ignited body; and sensible, or relative heat, respects only the comparative velocity of the parts. Thus, equal bulks of mercury and water set in a sand-heat, where the heat of the fire may be uniformly communicated to both, will acquire in equal times equal degrees of absolute heat: but the relative heat of the water, or that which is sensible to the finger, will be near 14 times as great as that of the mercury, because the water, having 14 times a less quantity of matter, will admit of velocity so much in proportion greater.

Again, if mercury and water have the same relative or sensible heat, that is, if both are heated in such a manner as to cause an equal ascent in the thermometer, then a quantity of mercury will heat 14 times as much water as the same quantity of water will do; or it will make the same quantity of cold water 14 times hotter than the same quantity of hot water can. All which is easy to be shewn by experiment, and abundantly proves, that heat and fire are wholly owing to the velocity of the parts of the heated or ardent body: on which theory the various phænomena of heat, cold, fire, burning, &c. are rationally accounted for. For first we are to consider, that cold and heat are only comparative terms, or that the same thing may either be too hot, or too cold, according to the relative idea or standard-degree. Thus ice or snow, is said to be cold with respect to the finger, but ice or snow is warm if compared to a freezing mixture, so that if (as we commonly do) we make the hand or any part of the body the standard of heat and cold, or the term of comparison, then it is evident, 1. If the parts of any body applied to the hand have the same velocity as the parts of the hand, such a body we naturally pronounce is neither hot nor cold. 2. If the particles of the body have a greater velocity than those of the hand, we pronounce it warm, if the excess be small; but hot, if it be great. 3. If the velocity of the parts of the body applied be less than that in the hand, the sensation then is what we call cold, which also may be in various degrees. 4. Hence it is plain there can be no such thing as absolute cold, but where the particles of matter are absolutely quiescent, or at rest. 5. Hence also, there can be no such thing as absolute heat, because no degree of velocity can be assigned but a greater is still assignable, till we come to infinity; where we are quite lost, as having no idea of infinite velocity or heat.

From this theory of heat and cold, we may conclude, that there is no body in nature whose parts are not in motion, in some degree, since we have yet been able to discover no ultimate degree or limit of cold; and if any such thing were to be found in nature, it is likely that it would be as impossible to bear or endure the test, as any extreme degree of heat; both heat and cold naturally tending to destroy the animated part, or test, in the extreme degrees: cold, by destroying the vital motion, and fixing the part rigid

 and

and inflexible; but heat, by putting the parts into too great an agitation, causing a greater velocity of the fluids and dissipation, and a force of tension in the solids, beyond what the natural state of the body can bear; and therefore it will inevitably destroy it.

Kinds, degrees, directions, &c. of HEAT, in chemistry, *&c.* See the article FIRE.

HEAT, in geography. The earth being farther removed from the sun in summer than in winter, as was shewn under the article EARTH, it may be asked, how it comes to pass, that since the sun is the fountain of heat as well as light, our winters are much colder than our summers. In answer to this, it is to be considered that the rays of the sun fall with much less obliquity upon the surface of the earth, on our side of the equator in the summer, than in the winter; and therefore they not only act more forcibly upon it, but a greater quantity of them fall upon a given place. For it is shewn in mechanics, that a moving body, striking perpendicularly on another, acts on it with all its force, and that a body striking obliquely, acts with the less force, the more it deviates from the perpendicular. Now fire, moving in right lines, must observe the same mechanical law as other bodies; and consequently its action must be measured by the angle of incidence; and hence fire striking on any obstacle in a direction parallel thereto, has no sensible effect, by reason the ratio is almost infinite, *i. e.* nothing: hence the sun radiating on the earth in the morning, scarce produces any warmth at all. Again, in the winter, besides that the sun is much lower in the heaven when at its meridian height, than in the summer, its rays pass through a longer portion of the earth's atmosphere, by which great part are intercepted, and some by various refractions and reflections, turned another way. See the article ATMOSPHERE.

And lastly, in summer, the sun continues with us sixteen hours, and is absent but eight, whereas in winter it is with us but eight hours, and is absent sixteen, all which things conspire to make a considerable alteration with respect to heat and cold.

If this be so, why is not the weather hotter, when the sun is in the tropic of cancer, its rays then falling with the least obliquity, and passing the shortest way through the atmosphere, and the days being then at the longest, than it is about a month afterwards, when the sun is in the next sign? In answer to this, it is to be remembered that bodies are not always the hottest at that very instant the greatest degree of heat is applied to them: they require time to heat, as well as to cool; it is the length of time therefore that the heat is applied to them, as well as the degreee of it, that determines the quantity of heat communicated to them. For the like reason we find it warmer about two o'clock in the afternoon, than at twelve, when the sun is in its meridian altitude, and its rays fall thickest and most forcibly upon the earth.

The diversity of the heat of climates and seasons arising chiefly from the different angles under which the sun's rays strike upon the surface of the earth, Dr. Hally gives a mathematical computation of the effect of the sun under the different seasons and climates, going upon the mechanical principle already laid down: whence the vertical ray which is of the greatest heat being put for radius, the force of the sun on the horizontal surface of the earth will be to that as the sine of the sun's altitude at any other time: but how strictly just this calculation may be, for reasons already assigned, and from the following considerations, we wholly leave to the sagacity of our readers to determine. Let it be considered, that the different degrees of heat and cold in different places depend in a very great measure upon the accidents of situation, with regard to mountains and vallies, and the soil. The first greatly helps to chill the air by the winds which come over them, and which blow in eddies thro' the levels beyond; and mountains, sometimes turning a concave side to the sun, have the effects of a burning mirror upon the subject plain; and the like effect is sometimes had from the convex parts of clouds, either by refraction or reflection. As to soils, a stony, sandy, or chalky earth, it is known, reflects most of the sun's rays into the air again, and retains but few, by which means a considerable accession of heat is derived to the air; as, on the contrary, black, loose soils absorb most of the rays, and return few into the air, so that the ground is much the hotter.

The following table of the heat of different climates is computed for every tenth degree of latitude, to the equinoctial and tropical

tropical ſun; by which an eſtimate may be made of the intermediate degrees.

Lat.	Sun in ♈ ♎	Sun in ♋	Sun in ♑
0	20000	18341	18341
10	19696	20290	15854
20	18797	21737	13166
30	17321	22651	10124
40	15321	23048	6944
50	12855	22991	3798
60	10000	22773	1075
70	6840	23543	000
80	3473	24673	000
90	0000	25055	000

Hence are deducible the following corollaries. 1. That the equinoctial heat, when the ſun becomes vertical, is as twice the ſquare of the radius, which may be propoſed as a ſtandard to compare with in all other caſes. 2. That under the equinoctial, the heat is as the ſine of the ſun's declination. 3. That in the frigid zones, where the ſun ſets not, the heat is as the circumference of a circle into the ſine of the altitude at 6; and conſequently that in the ſame latitude theſe aggregates of warmth are as the ſine of the ſun's declination; and at the ſame declination of the ſun, they are as the ſines of the latitudes into the ſigns of the declination. 4. That the equinoctial day's heat is every where as the coſine of the latitude. 5. In all places where the ſun ſets, the difference between the ſummer and winter-heats, when the declinations are contrary, is equal to a circle into the ſine of the altitude at 6 in the ſummer parallel; and conſequently theſe differences are as the ſine of the latitude into or multiplied by the ſines of declination. 6. From the foregoing table, it appears that the tropical ſun under the equinoctial, has of all others the leaſt force. Under the pole, it is greater than any other day's heat whatever; being to that of the equinoctial as 5 to 4.

From the table and theſe corollaries, a general idea may be conceived of the ſum of all the actions of the ſun in the whole year; and thus that part of heat which ariſeth ſimply from the preſence of the ſun, may be brought to a geometrical certainty. The heat of the ſun for any ſmall portion of time is always as a rectangle contained under the ſine of the angle of incidence of the rays producing heat at that time.

Heat is uſually divided by the ſchool philoſophers into actual and potential; the former of which is that hitherto treated of, and the latter that which we find in pepper, wine, and certain chemical preparations, as of oil of turpentine, brandy, quick-lime, &c.

The peripatetics account for the heat of quick-lime from an antiperiſtaſis. The epicureans, and other corpuſcularians, attribute even potential heat to atoms, or particles of fire detained and locked up in the pores of theſe bodies, and remaining at reſt therein, which being excited to action again by the heat and moiſture of the mouth, or by the effuſion of cold water, or the like cauſe, then break their incloſures, and diſcover what they are.

In the memoirs of the french academy, for the year 1713, the reader may find this doctrine well illuſtrated by M. Lemery, the younger, in the inſtances of quick-lime, regulus of antimony, tin, &c. which account Mr. Boyle endeavours to ſet aſide, and ſubſtitute a mechanical property, *viz.* a peculiar texture of parts in theſe caſes in lieu of fire. See Boyle's Mechanical Origin of Heat and Cold.

Heat, in the animal œconomy, known by the ſeveral names of natural heat, vital heat, innate heat, and animal heat, is commonly ſuppoſed to be that generated by the attrition of the parts of the blood, occaſioned by its circulatory motion, eſpecially in the arteries.

To what organs, or operations, the heat of the human body, and other animal bodies, is owing, is hitherto extremely doubtful. The opinions that at preſent prevail are, 1. That the heat of animal bodies is owing to the attrition betwixt the arteries and the blood. 2. That the lungs are the fountain of this heat. 3. That the attrition of the parts of the ſolids on one another produce it. 4. That it is owing to the mechanical attrition of the particles of our fluids. To which opinions Dr. Stevenſon of Edinburgh, adds a 5, *viz.* That whole proceſs by which our aliment and juices are conſtantly undergoing ſome alteration.

The reaſonings in favour of theſe ſeveral opinions may be ſeen at large, as laid down by the above-mentioned author in an eſſay on the cauſe of animal heat, in the Medical Eſſays, vol. vi. The chief arguments in favour of the firſt opinion,

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are, that if an artery is tied, or cut, the part to which it goes, turns cold; and on the ceasing of the pulsation of the arteries, cold and death follow. An increase of heat attends a brisk circulation, and a languid circulation is accompanied with a small heat. One who burns in a fever, or is hot with exercise, has a full and frequent pulse. In cold faintings, chlorosis, *&c.* the pulse is small and slow. To these they add, that the thermometer shews the arterial blood to be a little hotter than that of the veins.

This is accounted for from the conical figure of the arteries, from their fluxes and branches into exquisitely small capillaries; whence the resistance, and consequently the attrition must be great, from the number, strength, and elasticity of their coats; from the propelling power of the heart, and their strong resistance. From all these it is inferred, that the particles of blood perpetually getting new motions, directions, and rotations, are attenuated, condensed, have their angles grinded off, and are made homogeneous: hence, it is said, follows the fluidity, red colour, and heat of the mass, which is here perfected. See the articles ARTERY, HEART, CIRCULATION, and BLOOD.

The second opinion is, that the lungs are the fountain of heat in the human body. All that has been said for the blood's being heated in the arteries, is advanced to prove this hypothesis, with considerable additions, *viz.* that in the lungs the blood vessels every where attend, divide, and subdivide, along with the ramifications of the wind-pipe, and as these are perpetually changing their situation and form, becoming longer, or shorter, making more acute, or more obtuse angles, so must the concomitant blood-vessels every moment make new angles, and give the blood new directions; that at last it enters into an exquisitely fine net-work, spreads every where on the vastly thin air vesicles, where these air bladders are perpetually changing their angles, points of contact, their form, volume, interstices, and so forth. From these and the elasticity of the air, and weight of the atmosphere, the blood is said to be churned, pressed backward and forward, broken and kneaded together, dissolved and condensed, made red and hot in respiration.

The third opinion is, that the cause of the animal heat is owing to the action of the solid parts upon one another. The reason in support of this opinion, is, that the heart and arteries move most; thence that it is natural to think, that the heat should be owing to this motion.

The fourth opinion is, the mechanical attrition of the particles of the fluids upon one another. Dr. Stevenson observes, that those who support this hypothesis, must not only suppose that mechanical attrition begets heat, but begets itself without diminution; that they must not only shew what sets this attrition agoing, but what maintains it, because all mechanical force perpetually decreases in a resisting medium; in short, that they must shew the possibility of a perpetuum mobile, the impossibility of which they themselves demonstrate.

The fifth opinion is, what Dr. Stevenson calls the animal process, or that process by which our aliment and fluids are perpetually undergoing some alteration. This process, according to that writer, may be one *sui generis*, somewhat of a middle nature betwixt fermentation and putrefaction; and he thinks it comes so near to the latter, that he chooses to call it by that name. In putrefaction, which is a most powerful dissolvent of bodies, the intestine action of their minute particles creates, collects, or some way or other is the cause or means of heat. The doctor thinks it probable that this process is constantly carried on in all our juices, especially where there is blood; and this is chiefly in the veins, so that the blood is both the fountain of heat and the first spring of motion.

The late Dr. Mortimer, in the Philos. Trans. nº 476. gives it as his opinion, that the heat of animals is explicable from the phosphorus and air they contain. Phosphorus exists, at least in a dormant state, in animal fluids; and it is also known, that they all contain air: it is therefore only necessary to bring the phosphoreal and aereal particles into contact, and heat must of consequence be generated.

HEATH, *erica*, in botany, a genus of the octandria-monogynia class of plants, the flower of which consists of one erect and quadrifid petal; and its fruit is a quadrilocular capsule, containing a great number of very small seeds.

The diſtilled water of heath-flowers is recommended for ſore eyes, as alſo for the colic; and fomentations of them are ſaid to be good in the gout and paralytic caſes.

Berry-bearing-HEATH, a name given to empetrum. See EMPETRUM.

HEATH HEN, a name ſometimes given to the grouſe. See the article GROUSE.

HEATHENS, in matters of religion, the ſame with pagans. See PAGAN.

HEAVING, in the ſea-language, ſignifies throwing any thing over-board. Alſo turning about the capſtan, is called heaving at the capſtan. Likewiſe, when a ſhip being at anchor, riſes and falls by the force of the waves, ſhe is ſaid to heave and ſet.

HEAVEN, *cœlum*, literally ſignifies the expanſe of the firmament, ſurrounding our earth, and extended every way to an immenſe diſtance.

The Hebrews acknowledged three heavens: the firſt the aerial heaven, in which the birds fly, the winds blow, and the ſhowers are formed; the ſecond, the firmament in which the ſtars are placed; the third, the heaven of heavens, the reſidence of the Almighty, and the abode of ſaints and angels.

Heaven is conſidered by chriſtian divines and philoſophers, as a place in ſome remote part of infinite ſpace, in which the omnipreſent Deity is ſaid to afford a nearer and more immediate view of himſelf, and a more ſenſible manifeſtation of his glory, than in the other parts of the univerſe. This is often called the empyrean, from that ſplendor with which it is ſuppoſed to be inveſted; and of this place the inſpired writers give us the moſt noble and magnificent deſcriptions.

The pagans conſidered heaven as the reſidence only of the celeſtial gods, into which no mortals were admitted after death, unleſs they were deified. As for the ſouls of good men, they were conſigned to the elyſian fields. See the article ELYSIUM.

Cryſtalline HEAVENS. See the article CRYSTALLINE.

HEAVINESS, in general, the ſame with weight or gravity. See GRAVITY and WEIGHT.

HEAVY, in the manege. A horſe is ſaid to reſt heavy upon the hand, when, thro' the ſoftneſs of his neck, the weakneſs of his back, and the weight of his fore-quarters, or through wearineſs, he throws himſelf upon the bridle, but without making any effort to eſcape the horſeman's hand.

By ſtopping him, and making him frequently go back, you may make him light upon the hand; that is, if his heavineſs proceeds from lazineſs and ſtiffneſs; but if it is occaſioned by a defect in his back, there is no remedy for it.

HEBDOMARY, a ſolemnity of the antient Greeks, in honour of Apollo, in which the Athenians ſung hymns in honour of that god, and carried in their hands branches of laurel. The word ſignifies the ſeventh day, this ſolemnity being obſerved on the ſeventh day of every lunar month.

HEBENSTRETIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the flower of which is monopetalous, with a cylindraceous tube ſhorter than the calyx, and quadrifid at the limb; the fruit is an oblong capſule, containing two oblong ſeeds, convex and furrowed on one ſide, and plane on the other.

HEBRAISM, an idiom or manner of ſpeaking peculiar to the hebrew language. See the next article.

HEBREW, or HEBREW LANGUAGE, that ſpoken by the antient Jews, and wherein the Old Teſtament is wrote.

This appears to be the moſt antient of all the languages in the world, at leaſt we know of none older: and ſome learned men are of opinion, that this is the language in which God ſpoke to Adam in Paradiſe, and in which the ſaints will ſpeak in heaven.

The books of the Old Teſtament are the only pieces to be found, in all antiquity, written in pure Hebrew; and the language of many of theſe is extremely ſublime: it appears perfectly regular, and particularly ſo in its conjugations; indeed, properly ſpeaking it has but one conjugation, but this is varied in each ſeven or eight different ways, which has the effect of ſo many different conjugations, and affords a great variety of expreſſions to repreſent by a ſingle word the different modifications of a verb, and many ideas which in the modern, and in many of the antient and learned languages, cannot be expreſſed without a periphraſis.

The primitive words, which are called roots, have ſeldom more than three letters or two ſyllables.

In this language there are twenty-two letters, only five of which are uſually reckoned vowels, which are the ſame with

with ours, *viz.* *a, e, i, o, u,* but then each vowel is divided into two, a long and a ſhort, the ſound of the former being ſomewhat grave and long, and that of the latter ſhort and acute: it muſt however be remarked, that the two laſt vowels have ſounds that differ in other reſpects beſides quantity, and a greater or leſs elevation. To theſe ten or twelve vowels may be added others called ſemi-vowels, which ſerve to connect the conſonants, and to make the eaſier tranſitions from one to another. The number of accents in this language are, indeed, prodigious: of theſe there are near forty, the uſe of ſome of which, notwithſtanding all the enquiries of the learned, are not yet perfectly known. We know, in general, that they ſerve to diſtinguiſh the ſentences like the points called commas, ſemicolons, *&c.* in our language; to determine the quantity of the ſyllables, and to mark the tone with which they are to be ſpoke or ſung. It is no wonder then, that there are more accents in the hebrew than in other languages, ſince they perform the office of three different things, which in other languages are called by different names.

HEBREWS, or *Epiſtle to the* HEBREWS, a canonical book of the New Teſtament.

Though St. Paul did not prefix his name to this epiſtle, the concurrent teſtimony of the beſt authors, antient and modern, affords ſuch evidence of his being the author of it, that the objections to the contrary are of little or no weight. His mentioning himſelf in it, as lately a priſoner in Italy, and his promiſe to viſit the Hebrews, together with Timothy, who had been releaſed from impriſonment, both denote the writer, and the time of his writing this epiſtle, that it was juſt after the deliverance of St. Paul from his firſt trial at Rome.

The Hebrews, to whom this epiſtle was wrote, were the believing Jews of Paleſtine, and its deſign was to convince them, and, by their means, all the jewiſh converts, whereſoever diſperſed, of the inſufficiency and aboliſhment of the ceremonial and ritual law. In order to which he undertakes to ſhew, firſt, the ſuperior excellency of Chriſt's perſon above that of Moſes: ſecondly, the ſuperiority of Chriſt's prieſthood above the levitical; thirdly, the mere figurative nature, and utter inſufficiency of the legal ceremonies and ſacrifices: and, fourthly, that to forſake the moſaical law, was not, as the Jews boldly aſſerted, to apoſtatize from God, but was their indiſpenſible duty and obligation. Theſe particulars are intermixed with proper inferences and exhortations, all tending to ſhew the jewiſh chriſtians the unreaſonableneſs, folly, and danger of relapſing into judaiſm.

HEBRIDES, iſlands on the weſt of Scotland, of which Sky, Mull, Iſla, and Arran are ſome of the largeſt.

HECATOMB, among the antient pagans, was the ſacrifice of an hundred bulls or oxen; or, in a leſs confined ſenſe, an hundred animals of any ſort.

Pythagoras is ſaid to have ſacrificed an hecatomb to the muſes, through joy and gratitude for his having diſcovered the demonſtration of the XLVIIth propoſition in the firſt book of Euclid, *viz.* that, "In a rectangled triangle, the ſquare of "the hypothenuſe is equal to the ſquares "of the other two ſides."

Julius Capitolinus relates, that when an hecatomb was to be ſacrificed, they erected for that purpoſe an hundred altars of turf, on each of which they ſacrificed one animal. He adds, that when the emperors offered hecatombs, they ſometimes conſiſted of an hundred lions, an hundred eagles, or the like.

HECATOMBÆON, ἑκατομβαιων, in antient chronology, the firſt month of the athenian year, conſiſting of thirty days, and anſwering to the latter part of our June and beginning of July. It was ſo called on account of the many hecatombs ſacrificed in it.

HECK, an engine to take fiſh in the river Ouſe. A ſalmon heck is a grate for catching that ſort of fiſh.

HECKLE. See the article HATCHEL.

HECKLING *of hemp and flax.* See the articles HEMP and FLAX.

HECTIC, or HECTIC FEVER, a kind of ſlow fever, occaſioned by exulcerations of the lungs, and the purulent matter mixing with the blood, and diſturbing its natural motion. The ſymptoms are an unuſual heat in the palms of the hands, a redneſs of the cheeks, eſpecially after eating; alſo a weak, but quick pulſe, a languid habit of body, and loſs of ſtrength.

It is of the utmoſt conſequence, ſays Dr. Mead, to attempt the cure of this dreadful diſeaſe early; and as it ariſes from inflammations, it requires repeated bleedings. Dr. Pringle recommends the ſame practice, with the uſe of ſetons and iſſues,

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made in the ſide that is moſt affected. He obſerves, that he found nothing diminiſh the hectic fits ſo much as ſmall but repeated bleedings, eſpecially when ſaline draughts and a cooling diet are taken at the ſame time. In thirſt, heat, and other ſymptoms, the ſigns of a putrid ſtate of the humours, the ptiſan is to be acidulated with the ſpirit of vitriol, and the aliments are to be choſen of the aceſcent kind. A mixture of equal parts of barley-water and ſweet milk, ſeaſoned with ſugar and nutmeg, makes a proper and an agreeable part of diet; and in caſe of coſtiveneſs, let the patient drink a decoction of bran with raiſins and liquorice. Colliquative ſweats are moſt ſafely checked by lime-water, whereof the patient may drink about a pint a day, ſoftened with a little new milk.

A milk-courſe, though much recommended by phyſicians, as having the double advantage of being food and phyſic, ought to be taken with caution; not only becauſe ſome people have a natural averſion to milk, but becauſe in head-achs, acute fevers, flatulencies, bilious looſeneſſes, and bloody ſtools, it is found to be very prejudicial. The preference is generally given to aſſes-milk, as being moſt cooling and detergent; but when it can be conveniently had, whey made of cows-milk, or even of goats, may be ſubſtituted in its room, eſpecially if the goats have been fed on fragrant herbs. In caſe the milk does not agree with the ſtomach, as frequently happens, it ſhould be medicated in the following manner: take of red roſes dried, of balauſtines, pomegranate-rind, and cinnamon, each one dram; and boil them in a pint of cows-milk: when the decoction begins to boil, pour a little cold water into it, to make it ſubſide. Repeat this proceſs ſeveral times, and laſtly ſtrain off the liquor, ſweeten it with ſugar, and ſet it by for uſe. Others recommend equal quantities of milk and an infuſion of male ſpeedwell, ſow-thiſtle, ſage of Jeruſalem, liverwort, colts-foot, ground-ivy, maiden-hair, flowers of St. John's wort, and roſes, with a little ſugar a few drops of oil of tartar per deliquium: this muſt be drank pretty warm, and continued for ſix weeks. But above all, freſh butter-milk is ſaid to be the moſt efficacious ſpecific.

Medicines that are gently corroborating are alſo uſeful: ſuch are the ſolution of coral, or mother of pearl, in orange juice; cortex eleutherii, or peruvian bark, made into an electuary with ſyrup of lemons. Heiſter affirms he has cured many of theſe fevers with the bark, in a few days. But above all things, riding daily muſt not be forgot, as being the beſt kind of exerciſe, and highly beneficial in theſe diſtempers.

Hectics attack children ſometimes from voracity, and at others from refrigeration of the body; in which caſes the uſe of the temperate baths of ſweet water, continued for ſome time, is ſaid to be of great ſervice; and to remove the obſtructions of the meſeraic glands and veſſels, the frequent but ſparing uſe of the following ſaline aperient mixture will be neceſſary: take of ſalt of tartar, nitre, and arcanum duplicatum, each two drams; ſal ammoniac, three drams: mix them all together, and let a little of the mixture be put into the child's drink, according to his age and ſtrength.

HEDERA, IVY, in botany. See IVY.

HEDERA TERRESTRIS, GROUND-IVY, a genus of plants called by Linnæus glechoma. See the articles GLECHOMA and GROUND-IVY.

HEDGES, in agriculture, are either planted to make fences round incloſures, or to divide the ſeveral parts of a garden. When they are deſigned as outward fences, they are planted either with haw thorn, crabs, or black-thorn; but thoſe hedges which are planted in gardens, either to ſurround wilderneſs-quarters, or to ſcreen the other parts of a garden from ſight, are planted according to the fancy of the owner, ſome preferring ever-greens, in which caſe the holly is beſt; next the yew, then the laurel, lauruſtinus, phillyrea, *&c.* others prefer the beech, the hornbeam, and the elm. See the article GARDEN.

Before planting, it is proper to conſider the nature of the land, and what ſort of plants will thrive beſt in it; and alſo, what is the ſoil from whence the plants are to be taken. As for the ſize, the ſets ought to be about the bigneſs of one's little finger, and cut within about four or five inches of the ground; they ought to be freſh taken up, ſtraight, ſmooth, and well rooted. Thoſe plants that are raiſed in the nurſery, are to be preferred.

In planting outſide hedges, the turf is to be laid with the graſs-ſide downwards, on that ſide of the ditch the bank is deſigned to be made; and ſome of the beſt mould ſhould be laid upon it to bed the quick, which is to be ſet upon it a foot aſunder. When

When the firſt row of quick is ſet, it muſt be covered with mould, and when the bank is a foot high, you may lay another row of ſets againſt the ſpaces of the former, and cover them as you did the others: the bank is then to be topped with the bottom of the ditch, and a dry or dead-hedge laid, to ſhade and defend the under-plantation. Stakes ſhould then be driven into the looſe earth, ſo low as to reach the firm ground: theſe are to be placed at about two feet and a half diſtance, and in order to render the hedge yet ſtronger, you may edder it, that is, bind the top of the ſtakes with ſmall long poles, and when the eddering is finiſhed, drive the ſtakes anew.

The quick muſt be kept conſtantly weeded, and ſecured from being cropped by cattle; and in February it will be proper to cut it within an inch of the ground, which will cauſe it ſtrike root afreſh, and help it much in the growth.

When an hedge is about eight or nine years growth, it will be proper to plaſh it; for the method of doing which, ſee the article PLASHING.

The crab is frequently planted for hedges; and if the plants are raiſed from the kernels of the ſmall wild crabs, they are much to be preferred to thoſe raiſed from the kernels of all ſorts of apples without diſtinction; becauſe the plants of the true ſmall crab never ſhoot ſo ſtrong as thoſe of the apples, and may therefore be better kept within the proper compaſs of an hedge.

The black-thorn, or ſloe, is frequently planted for hedges; and the beſt method of doing it, is to raiſe the plants from the ſtones of the fruit, which ſhould be ſown about the middle of January, if the weather will permit, in the place where the hedge is intended; but when they are kept long out of the ground, it will be proper to mix them with ſand, and keep them in a cool place. The ſame fence will do for it when ſown, as when it is planted.

The holly is ſometimes planted for hedges; but where it is expoſed, there will be great difficulty in preventing its being deſtroyed; otherwiſe, it is by far the moſt beautiful plant, and being an ever-green, will afford much better ſhelter for cattle in winter, than any other ſort of hedge. The beſt method of raiſing theſe hedges, is to ſow the ſtones in the place where the hedge is intended, and where this can be conveniently done, the plants will make a much better progreſs than thoſe that are tranſplanted; but theſe berries ſhould be buried in the ground ſeveral months before they are ſown. The way to do this, is to gather the berries about chriſtmas, when they are uſually ripe, and put them into large flower-pots, mixing ſome ſand with them; then dig holes in the ground into which the pots muſt be ſunk, covering them over with earth, about ten inches thick. In this place they muſt remain till the following October, when they ſhould be taken up, and ſown in the place where the hedge is intended to be made. The ground ſhould be well trenched, and cleared from the roots of all bad weeds, buſhes, trees, &c. Then two drills ſhould be made, at about a foot-diſtance from each other, and about two inches deep, into which the ſeeds ſhould be ſcattered pretty cloſe, leſt ſome ſhould fail. When the plants grow up, they muſt be carefully weeded; and if they are deſigned to be kept very neat, they ſhould be cut twice a year, that is in May and in Auguſt; but if they are only deſigned for fences, they need only be ſheered in July. The fences for theſe hedges while young, ſhould admit as much free air as poſſible: the beſt ſort are thoſe made with poſts and rails, or with ropes drawn through holes made in the poſts; and if the ropes are painted over with a compoſition of melted pitch, brown ſpaniſh colour and oil, well mixed, they will laſt ſeveral years.

Hedges for ornament in gardens are ſometimes planted with ever-greens, in which caſe the holly is preferable to any other. Next to this, moſt people prefer the yew; but the dead colour of its leaves renders thoſe hedges leſs agreeable. The laurel is one of the moſt beautiful ever-greens, but the ſhoots are ſo luxuriant that it is difficult to keep it in any tolerable ſhape; and as the leaves are large, to prevent the diſagreeable appearance given them by their being cut through with the ſheers, it will be the beſt way to prune them with a knife, cutting the ſhoots juſt down to a leaf. The lauruſtinus is a very fine plant for this purpoſe; but the ſame objection may be made to this as to the laurel; this, therefore, ought only to be pruned with a knife in April, when the flowers are going off; but the new ſhoots of the ſame ſpring muſt by no means be ſhortened. The ſmall-leaved and rough-leaved lauruſtinus are the beſt plants for this

this purpofe. The true phillyrea is the next beft plant for hedges, which may be led up to the height of ten or twelve feet, and if they are kept narrow at the top, that there may not be too much width for the fnow to lodge upon them, they will be clofe and thick, and make a fine appearance. The ilex or ever-green oak, is alfo planted for hedges, and is a fit plant for thofe defigned to grow very tall. The deciduous plants ufually planted to form hedges in gardens are, the hornbeam, which may be kept neat with lefs trouble than moft other plants. The beech, which has the fame good qualities as the hornbeam; but the gradual falling of its leaves in winter caufe a continual litter. The fmall-leaved englifh elm is a proper tree for tall hedges, but thefe fhould not be planted clofer than eight or ten feet. The lime-tree has alfo been recommended for the fame purpofe; but after they have ftood fome years they grow very thin at bottom, and their leaves frequently turn of a black difagreeable colour.

Many of the flowering fhrubs have alfo been planted in hedges, fuch as rofes, honeyfuckles, fweet-briar, *&c.* but thefe are difficult to train; and if they are cut to bring them within compafs, their flowers, which are their greateft beauty, will be entirely deftroyed.

HEDGE-HOG. See *Hedge*-HOG.

HEDGE-SPARROW, the brown motacilla, white underneath, and with a grey fpot behind the eyes. See MOTACILLA.

This is of the bignefs of the red-breaft; the head is large and rounded; the eyes fmall, and their iris hazel; the beak is flender; the ears are large and patulous.

HEDMORA, a city of Sweden, in the province of Weftmania, fituated on the river Dalecarlia, fifty miles north-weft of Upfal: eaft long. 15° 55′, and north lat. 60° 16′.

HEDYOTIS, in botany, a genus of the tetrandria-monogynia clafs of plants, the flower of which is monopetalous and infundibuliform; and its fruit is a bilocular capfule, containing a great number of feeds.

HEDYSARUM, the FRENCH HONEY-SUCKLE, in botany, a genus of the diadelphia-decandria clafs of plants, the corolla of which is papilionaceous and ftriated; the fruit of a bivalve articulated pod, each joint of which is roundifh, compreffed, and containing one kidney-fhaped-feed.

This plant is deobftruent and vulnerary.

HEEL, in anatomy, the hind-part of the foot. See FOOT and CALCANEUM.

HEEL *of a horfe*, the lower hinder part of the foot, comprehended between the quarters, and oppofite to the toe.

The heel of a horfe fhould be high and large, and one fide of it fhould not rife higher than the other upon the paftern. To recover the heels of a horfe that is hoof-bound, you fhould take out his fole, and keep his heels very wide, by which they will be reftored in a month.

HEEL *of a horfeman.* This being the part that is armed by the fpur, the word is ufed for the fpur itfelf; as, this horfe underftands the heels well.

To ride a horfe from one heel to another, is make him go fideways, fometimes to one heel, and fometimes to another.

HEEL, in the fea-language. If a fhip leans on one fide, whether fhe be aground or a-float, then it is faid fhe heels a-ftarboard, or a-port; or that fhe heels offwards, or to the fhore; that is, inclines more to one fide than to another.

HEEL *of the maft*, that part of the foot of any maft, which is pared away flanting on the aftward fide thereof, in order that it may be ftayed aftward on. The heels of the top-mafts are fquares.

HEELER, or *Bloody* HEEL-*cock*, a fighting cock that ftrikes or wounds much with his fpurs.

The mafters know fuch a cock even while a chicken, by the ftriking of his two heels together in his going.

HEGIRA, in chronology, a celebrated epocha among mahometans. See the article EPOCHA.

The event which gave rife to this epocha was the flight of Mahomet from Mecca, with his new profelytes, to avoid the perfecution of the coraifchites; who, being then moft powerful in the city, could not bear that Mahomet fhould abolifh idolatry, and eftablifh his new religion. This flight happened in the fourteenth year after Mahomet had commenced prophet: he retired to Medina, which he made the place of his refidence.

The mahometans have many fabulous traditions concerning this flight of their falfe prophet from Mecca to Medina: Having taken a refolution, fay they, to leave the city, he went out one night, being the firft of the moon, accompanied only by Abubeker, his father-in-law, and paffed the night in a grotto, diftant an hour's journey from Mecca. As foon

as his retreat was known in the city, the coraiſchites, his declared enemies, went in purſuit of him, and arrived at the entrance of the grotto early the next morning: but that ſame night a large tree had grown up, at the mouth of the cave, in which the prophet was concealed; and what opening was left, was covered over with a ſpider's web; this being a plain indication, that nobody was in the cave, the coraiſchites went away, and Mahomet eſcaped the purſuit of his enemies.

HEIDELBURG, a city of Germany, in the circle of the lower Rhine, the capital of the palatinate, ſituated on the river Neckar: eaſt long. 8° 40′, and north lat. 49° 20′.

HEIGHT, *altitudo*, in geometry, is a perpendicular let fall from the vertex, or top, of any right-lined figure, upon the baſe or ſide ſubtending it. It is likewiſe the perpendicular height of any object above the horizon; and is found ſeveral ways, by two ſtaffs, a plain mirrour, with the quadrant, theodolite, or ſome graduated inſtrument, &c.

The meaſuring of heights or diſtances is of two kinds: when the place or object is acceſſible, as when you can approach to its bottom; or inacceſſible, when it cannot be approached.

Prob. I. To meaſure an acceſſible height AB, by means of two ſtaffs. See plate CXXIX. fig. 1. n° 1.

Let there be placed perpendicularly in the ground, a longer ſtaff D E, likewiſe a ſhorter one F G, ſo as the obſervator may ſee A, the top of the height to be meaſured, over the ends D, F, of the two ſtaffs; let F H and D C, parallel to the horizon, meet D E and A B in H and C: then the triangles F H D, D C A, ſhall be equiangular; for the angles at C and H are right ones: likewiſe the angle A is equal to F D H; wherefore the remaining angles are alſo equal. Therefore as F H, the diſtance of the two ſtaffs, is to H D, the exceſs of the longer ſtaff above the ſhorter; ſo is D C, the diſtance of the longer ſtaff from the tower, to C A, the exceſs of the height of the tower above the longer ſtaff: and thence C A will be found by the rule of three. To which if the length D E be added, you will have the whole height of the tower B A.

Scholium. Another method may be occaſionally contrived for meaſuring an acceſſible height, as by the given length of the ſhadow B D (*ibid.* n° 2.) I find out the height A B: for let there be erected a ſtaff C F, perpendicularly, producing the ſhadow E F: then it will be as E F, the ſhadow of the ſtaff, is to E C, the ſtaff itſelf; ſo is B D, the ſhadow of the tower, to B A, the height. Though the plane on which the ſhadow of the tower falls, be not parallel to the horizon, if the ſtaff be erected in the ſame plane, the rule will be the ſame.

Prob. II. To meaſure an acceſſible height by means of a plain mirrour.

Let A B (*ibid.* n° 3.) be the height to be meaſured; let the mirrour be placed at C, in the horizontal plane B D, at a known diſtance B C: let the obſerver go back to D, till he ſee the image of the ſummit in the mirrour, at a certain point of it, which he muſt diligently mark; and let D E be the height of the obſerver's eye. The triangles A B C and E D C, are equiangular; for the angles at D and B are right angles; and A C B, E C D, are equal, being the angles of incidence and reflection of the ray A C; wherefore the remaining angles at A and E, are alſo equal. Therefore it will be as C D is to D E; ſo is C B to B A.

Note 1. The obſerver will be more exact, if, at the point D, a ſtaff be placed in the ground perpendicularly, over the top of which the obſerver may ſee a point of the glaſs exactly in a line betwixt him and the tower.

Note 2. In place of a mirrour may be uſed the ſurface of water, which naturally becomes parallel to the horizon.

Prob. III. To meaſure an acceſſible height by the geometrical quadrant, theodolite, &c.

Let the angle C (*ibid.* n° 4.) be found. Then in the triangle A B C, right-angled at B (B C being ſuppoſed the horizontal diſtance of the obſerver from the tower) having the angle C, and the ſide B C, the required height will be found by the firſt caſe of plain trigonometry. Thus, ſuppoſe the angle C, 37° 24′, and the horizontal diſtance, B C 116, then the proportion will be as R : T. ∟ C : : C B : B A, the height.

The tangent altitude 37° 24′		9.88341
Log. C B 116	—	2.06446
	Added	11.94787
	Radius	10.00000
Height of the object A B 88.69		1.94787

Suppoſing the obſervation made on the top of the tower, and the height of the tower to be known, to find the diſtance of

of any object on the plane below; it is only the converse of the former case.

You may also, having the base and angles, easily find the hypothenuse A C, or how far it is from the top of the tower to the station, by the second case of right-angled triangles: and it is useful in many cases.

Prob. IV. To measure an inaccessible height by the geometrical quadrant, *&c.* at two stations.

Let the angle A C B be observed (*ibid.* n° 5.) then let the observer go from C, to the second station D, in the right line B C D; and after measuring this distance C D, take the angle A D C likewise with the quadrant. Then in the triangle A C D, which is formed by the two visual rays A D, A C, and the distance of the two stations D and C, there is given the angle A D C, with the angle A C D, because the angle A C B was given before: therefore the remaining angle C A D is given likewise. But the distance of the stations C and D is also given; therefore by the second case of oblique-angled trigonometry, the side A C will be found. Wherefore in the right-angled triangle A B C, all the angles and hypothenuse A C are given; consequently by the third case of plain trigonometry, the height sought, A B, may be found; as also the distance of the station C, from A B, the perpendicular within the hill or inaccessible height.

Example. Suppose the angle at C, 43° 30′, and the angle at D 32° 12′, and the distance C D, betwixt the two stations, 112 feet; then the angle D A C will be 11° 18′, and the angle C A B 46° 30′. Hence for C A, the proportion will be as S. ∟D A C : D C : : S. ∟D : C A.

The log. D C 112	—	2.04922
Sine ∟ D 32° 12′	—	9.72663
	Added	11.77585
S. ∟ D A C 11° 18′	—	9.29214
C A = 304.6	— —	2.48371

Then for A B, the height of the object, it will be as R : S. ∟ A C B : : C A : A B.

As radius	— —	10.00000
is to the sine of 43° 30′	—	9.83781
so is C A 304.6	—	2.48371
to A B 209.7	— —	2.32152

Lastly, for C B, the distance of the object from the nearest station, it will be as R : S. ∟ C A B : : C A : B C.

As radius	— —	10.00000
is to the sine of C A B 46° 30′		9.86056
so is C A 304.6	—	2.48371
to B C 221	— —	2.34427

If the height of the tower is wanted, the angle B C F (*ibid.* n° 6.) may be found with the quadrant, which being taken from the angle A C B already known, the angle A C F will remain; but the angle F A C was known before; therefore the remaining angle A F C will be known. But the side A C was supposed found by the last problem; therefore in the triangle A F C, all the angles, and one of the sides A C being known A F the height of the tower above the hill may be found by trigonometry.

Prob. V. To measure the distance of two places A and B, of which one, A, is accessible, by the theodolite, *&c. ibid.* n° 7.

Let there be erected at two points, A and C (sufficiently distant) visible signs; then let the two angles B A C, B C A, be taken by the theodolite. Let the distance of the stations A and C be measured with a chain. Then the third angle being known, and the side A C; therefore, by the second case of oblique trigonometry, the distance required A B, will be found.

Prob. VI. To measure, by the theodolite, *&c.* the distance of two places, neither of which is accessible. *ibid.* n° 8.

Let two stations C and D be chosen, from each of which the places may be seen whose distance is sought: let the angles A C D, B C D, and likewise the angles B D C, B D A, C D A, be measured by the theodolite, *&c.* the distance of the stations C and D be measured by a chain, or, if necessary, by the last problem. Now in the triangle A C D, there are given two angles A C D and A D C; therefore the third C A D is likewise given: moreover the side C D is given; therefore by the second case of oblique trigonometry, the side A D will be found. After the same manner, in the triangle B C D, from all the angles, and one side C D given, the side B D is found. Wherefore in the triangle A D B, from the given sides D A and D B, and the angle A D B contained by them, the side A B (the distance sought) is found to be the fourth case of oblique angled trigonometry. Note, That it is not necessary that the points A, B, C, and D be in one plane, and that any triangle is in one plane.

HEILA, a port-town of regal Prussia, in the kingdom of Poland, situated on the point of the peninsula in the Baltic-sea, twelve miles north of Dantzick: east long. 19°, north lat. 54° 30′.

HEINUSE, among hunters, a roe-buck of the fourth year.

HEIR, *hæres*, in law, signifies the person who succeeds another by descent to lands, tenements, and hereditaments, being an estate of inheritance, or an estate in fee; because nothing passes by right of inheritance but in fee.

Where there is a grandfather, father and son, if the father die before the grandfather, who afterwards dies seised in fee, the land, in that case, shall go to the eldest grandson, and not to any other children of the grandfather. On the father's dying without issue, &c. the next eldest brother shall have the lands, &c. as heir; and for want of a brother, they descend to the father's sisters. A man has issue only a daughter, and dies leaving his wife with child of a son, who is afterwards born; here the son, after his birth, is heir; however, in the mean time, the daughter is to have the land. Yet there are some persons disqualified from being heirs, as a bastard, an alien, one attainted of treason or felony, &c. but idiots and lunatics, persons excommunicated, or that are attainted in a premunire, and out-laws in debt, &c. are capable of being heirs.

The word heir is a collective term, and extend to all heirs, under which the heirs of heirs are comprehended; as where lands are given to a person and his heirs, all his heirs are thereby totally in him. The heir is favoured by common law: for not only land, but rent not due and in arrear at the death of the ancestor, shall go to the heir; so corn sown by a tenant for years, where his term expires before his corn is ripe, and every thing fastened to the freehold, timber-trees, deeds belonging to the inheritance, deer, conies, pigeons, fish, &c. go to the heir. Where an ancestor has bound himself and his heirs for the payment of money, or performance of some other act, the heir, tho' never so much land comes to him from such ancestor by gift in tail, or other such conveyance of the father, and not by descent, is no way chargeable; and it is likewise so in all other estates, except fee simple. If land be granted to a person and his heirs during the life of another, &c. the heir shall not be charged for this, no more than for lands intailed. The heir's body ought not to be taken in execution for the debt of his ancestor, nor any other lands but those he received in the case of descent: and whether an heir has land by descent or not, he is triable by a jury, who are to ascertain the value of the lands descended, in order to make the heir answerable. A creditor may sue either the heir, executor, or administrator, each of whom are chargeable; as is also a collateral heir, but in that case he must be specially charged as such: but where an heir, on being sued, pays his ancestor's debts, he shall be reimbursed by the executor of such ancestor, if he has assets in his hands. The heir has this advantage, that he can force the administrator to pay debts out of the personal estate of the intestate, in order to preserve the inheritance free; and where an executor has assets, the heir may in equity compel him to redeem a mortgage.

HEIR-APPARENT, is a person so called in the lifetime of his ancestor, at whose death he is heir at law.

HEIRESS, a female heir to one who has an estate in lands, &c. Stealing an heiress, and marrying her against her will, was declared felony by 3 Hen. VII.

HEIR-LOOME, is a word that comprehends in it divers pieces of furniture; as the first bed, and other things, which by the custom of some places have belonged to a house for several descents. These are never inventoried after the death of the owner as chattles, and therefore do not go to the executor or administrator, but to the heir along with the house, by custom, and not by common law.

Heir-loomes are not deviseable by will, for custom vests them in the heir before a devise: yet a sale thereof in the person's lifetime might make it otherwise.

HELEGUG, in ornithology, a name given to the arctic duck of Clusius.

HELENA, or *St.* HELENA, an island in the Atlantic ocean, situated 1200 miles west of the coast of Africa, and 1800 east of the coast of South America: west long. 6° 13', south lat. 16°.

It is about twenty-one miles round, and consists of one steep rock, which looks like a castle in the middle of the sea, and which is covered with about a foot of vegetable earth, that produces corn, grapes, and almost all manner of fruits and vegetables: but the corn is generally eaten up by the rats, and the country is too hot to make wine. It has but one landing place, which is defended by a platform, and a fort in which the gover-

nor refides. It is fubject to the englifh Eaft-India company, by whofe affiftance it was planted, after it was taken from the Dutch in the reign of king Charles II.

St. HELENA'S DAY, a feftival in the romifh church on the 18th of Auguft. This faint was the emprefs Helena, daughter of the emperor Conftantine, who, it is faid, difcovered the crofs of Chrift after it had been long buried in the ground.

HELENA, in aftronomy. See the article CASTOR.

HELENIA, or HELENIASTRUM, BASTARD-ELECAMPANE, in botany, a genus of the fyngenefia-polygamia-fuperflua clafs of plants, the compound flower of which is radiated, and confifts of a multitude of hermaphrodite and female ones, the former on the difk, and the latter on the verge. The hermaphrodite flowers are tubular, and quinquedentated at the limb; whereas the female ones are linear, ligulated, and trifid at the point. The ftamina are five flender and very fhort filaments; and the feed which is fingle, is contained in the cup.

HELENIUM, ELECAMPANE, in botany, *&c.* is ranked by Linnæus among the ftar-worts. See the articles ASTER and ELECAMPANE.

HELEPOLIS, in the antient art of war, a machine for battering down the walls of a place befieged, the invention of which is afcribed to Demetrius, the Poliorcete.

Diodorus Siculus fays, that each fide of the helepolis was 405 cubits broad, and 90 in height; that it had nine ftages, and was carried on four ftrong folid wheels eight cubits in diameter; that it was armed with large battering rams, and had two roofs capable of fupporting them; that in the lower ftages there were different forts of engines for cafting ftones; and in the middle they had large catapultas for lancing arrows, and fmaller in thofe above, with a number of expert men for working all thefe machines.

HELIACAL, in aftronomy, a term applied to the rifing or fetting of the ftars, or, more ftrictly fpeaking, to their emerfion out of and immerfion into the rays and fuperior fplendor of the fun.

A ftar is faid to rife heliacally, when after having been in conjunction with the fun, and on that account invifible, it comes to be at fuch a diftance from him, as to be feen in the morning before fun-rifing; the fun, by his apparent motion, receding from the ftar towards the eaft; on the contrary, the heliacal fetting is when the fun approaches fo near a ftar, as to hide it with his beams, which prevent the fainter light of the ftar from being perceived, fo that the terms apparition and occultation would be more proper than rifing and fetting.

All the fixed ftars in the zodiac, as alfo the fuperior planets, mars, jupiter, and faturn, rife heliacally in the morning, a little before fun-rifing, and a few days after they have fet cofmically. Again, they fet heliacally in the evening, a little before their achronycal fetting. But the moon, whofe motion eaftward is always quicker than the apparent motion of the fun, rifes heliacally in the evening, after the new moon; and fets heliacally in the morning, when old and approaching to a conjunction with the fun.

The inferior planets, venus and mercury, which fometimes feem to go weftward from the fun, and fometimes again have a quicker motion eaftward, rife heliacally in the morning, when they are retrograde; but when direct in their motions, they rife heliacally in the evening. The heliacal rifing or fetting of the moon, happens when fhe is 17° diftant from the fun; but for the other planets, 20° are required; and for the fixed ftars, more or lefs according to their magnitude.

HELIÆA, ἡλιαια, in grecian antiquity, was the greateft and moft frequented court in Athens for the trial of civil affairs. The judges who fat in it, were at leaft fifty, but the more ufual number was either two or five hundred. When caufes of great moment were to be tried, it was cuftomary to call in the judges of the other courts: fometimes a thoufand were called in, and then two courts are faid to have been joined: fometimes fifteen hundred or two thoufand were called in, and then three or four courts met together.

They had cognizance of civil affairs of the greateft weight and importance, and were not permitted to give judgment till they had taken a folemn oath to do it with impartiality, and to give fentence according to the laws, *&c.*

HELIANTHUS, *the* GREAT SUN-FLOWER, in botany, a genus of the fyngenefia-polygamia-fruftranea clafs of plants, the compound flower of which is radiated, with a multitude of cylindraceous hermaphrodite flowers on the difc, and a few very long ligulated female ones: the ftamina are five filaments; and the feeds are

are fingle, and contained in the cup. The flowers are yellow, and often more than a foot in diameter.

HELIASTES, in antiquity, one of the judges of the court of heliæa. See the article HELIÆA.

HELICTERES, the SCREW-TREE, in botany, a genus of the gynandria-decandria clafs of plants, the flower of which confifts of five oblong petals, equal in breadth; and the fruit is compofed of five unilocular capfules, containing a great many kidney-fhaped feeds, and twifted fpirally about one another.

HELIOCARPOS, in botany, a genus of the polyandria-digynia clafs of plants, the flower of which confifts of four linear petals, confiderably fhorter and narrower than thofe of the cup: the fruit is a pedunculated, bilocular capfule, of a turbinated oval figure, containing fingle feeds of an oval fhape.

HELIOCENTRIC *latitude of a planet*, the inclination of a line drawn between the center of the fun and the center of a planet, to the plane of the ecliptic, which may be thus determined.

If the circle F G H (plate CXXIX. fig. 2. n° 1.) reprefent the orbit of the earth round the fun, and the inner one, A N B *n*, be fo placed as to incline to the plane of the other; (on which account it appears in the form of an ellipfis) then when the planet is in the node *n*, it will appear in the ecliptic, and fo have no latitude. But if it move to P, then, being feen from the fun, it will appear to decline from the ecliptic, or to have latitude; and the inclination of the line S P to the plane of the ecliptic, is called the planet's heliocentric latitude; the meafure of which is the angle P S *p*, fuppofing the line P *p* to be perpendicular to the plane of the ecliptic.

This heliocentric latitude will be continually increafing till the planet come to the point A, which they call the limit, or utmoft extent of it; and then it will decreafe again, till it reach the other node N, when it will have no latitude; after which it will increafe again, till it come to B, or its utmoft latitude; and, laftly, decreafe again, till the planet come to be in *n*, whence it fet out.

HELIOCENTRIC *place of a planet*, in aftronomy, the place of the ecliptic wherein the planet would appear to a fpectator placed at the center of the fun.

The ingenious Dr. Halley gives the following method to find the heliocentrical places of a planet, and its diftances from the fun, which fuppofes only that the periodical time of the planet is known. Let KLB (*ibid.* n° 2.) be the orbit of the earth, S the fun, P the planet, or rather the point in the plane of the ecliptic, in which the perpendicular let fall from the planet meets that plane. And firft when the earth is in K, obferve the geocentric longitude of the planet, and having the theory of the earth, we have the apparent longitude of the fun, and confequently, the angle P K S. The planet, after it has completed an entire revolution, returns again to the point P, at which time fuppofe the earth in L; and there again, let the planet be obferved, and find the angle P L S, the planet's elongation from the fun. Having the times of obfervations, we have the places of the earth in the ecliptic, or the points K and L; and, confequently, the angle L S K, and the fides L S and S K: wherefore we fhall have the angles S K L and S L K, and the fide L K. From the known angles S K P and S L P, take away the known angles S K L and S L K, and we fhall have the angles P K L and P L K known; therefore in the triangle P L K, having all the three angles, and the fide L K, we fhall find the fide P L; and in the triangle P L S, having the fides P L and L S, and the intercepted angle P L S, we fhall have the angle L S P, which determines the heliocentric place, and its diftance from the node according to the ecliptic, as alfo the fide S P. But as the tangent of the geocentric latitude is to the tangent of the heliocentric, fo is the curtate diftance of the planet from the fun, to its curtate diftance from the earth. But as the geocentric latitude may be found by obfervation, the heliocentric latitude will alfo be found; by which, and the curtate diftance of the planet from the fun, we can find the true diftance.

HELIOCOMETES, a phænomenon fometimes obferved about fun-fetting; being a large luminous tail, or column of light, proceeding from the body of the fun, and dragging after it, not unlike the tail of a comet; whence the name.

HELIOSCOPE, in optics, a fort of telefcope, peculiarly fitted for viewing the fun, without hurting the eyes. See the article TELESCOPE.

As the fun may be viewed through coloured glaffes, without hurt to the eyes, if

if the object and eye-glasses of a telescope be made of coloured glass, as red or green, such a telescope will become an helioscope.

But Mr. Huygens only used a plain glass, blacked at the flame of a candle on one side, and placed between the eye-glass and the eye; which answers the design of an helioscope very well.

HELIOSTATA, in optics, an instrument invented by the late learned Dr. 'S Gravesande; who gave it this name, from its fixing, as it were, the rays of the sun in an horizontal direction across the dark chamber, all the while it is in use.

This instrument is an automaton, or piece of clock-work, whose parts are as follows. A A (plate CXXX.) is a frame in which a metalline speculum S is suspended, moveable about its axis by means of two small screws a, a. This frame is fixed to the piece C, which being hollow, is moveable upon the cylindric shaft P. This pillar is fixed on a triangular base or foot set perpendicular, by the three screws B, B, B.

On the back part of the speculum is fixed a long cylindric wire, or tail D, in a perpendicular position. By this it is connected to the second part of the heliostata, which is a common thirty-four hour clock, represented at H, the plane of which clock is set parallel to that of the equator in any given place. The clock is sustained on the column F G, in which it is moveable up and down by a thin lamina or plate that enters it as a case, and fixed by a proper height by two screws d, d, at the side. The whole is truly adjusted to a perpendicular situation by means of the three screws I, I, I, in the tripod L, L, M, and the plummet Q, whose capsis must answer to the point o beneath.

The axis of the wheel which moves the index N O, over the hour circle, is somewhat large, and perforated with a cylinddric cavity approaching a little to a conical figure; and receives the shank of the said index N O very close and tight, that by its motion the index may be carried round. In the extremity, O, of the index is a small cylindric piece, with a cylindric perforation to receive the tail t of the fork T, yet so as to admit a free motion therein. In each side of the fork are several holes exactly opposite to each other, in which go the screws r, r, upon whose smooth cylindric ends moves the tubular piece R.

When the machine is to be fixed for use, another part is made use of to adjust it; which is called the positor, and is denoted by the letters V X Y Z.

The cylinder C is removed with a speculum from the foot P, and the brass column V X put on in its stead, and adheres more strictly to the pin e, that it may keep its position while the machine is constituted.

On the top of the column, about X as a center, moves the lever Y Z, so that it may be any how inclined to the horizon, and keep its position. The arm Y X may be of any length at pleasure; but the arm X Z is of a peculiar construction, and of a determinate length. To this arm, which extends no farther than y, is a sliding-piece Z x, sharp pointed at Z. By this the arm X Z is determined to a given length, the piece Z x being fixed by the screws z z. Upon this arm is drawn the short line v x, by which it may be lengthened in the whole, and is $\frac{9}{100}$ of the whole length X Z, when shortest. The reason is, this arm is always to increase and decrease in proportion to the secant of the sun's declination to the radius X Z, when shortest; but the radius is to the secant of 23° 30′ (the sun's greatest declination) as 10000000 to 10904411, or as 100 to 109. Now the reason of this construction of the arm X Z, is to find for any given day the distance of the center of the speculum S from the top l of the style l N, which must ever be equal to the secant of the sun's declination; for it must always be equal to the distance of the top of the said style, l, from the center of the cylinder R in the fork T, and that is always equal to the said secant of declination.

For since the style l N and the fork T are in a position parallel to each other, therefore the middle hole in the sides of the fork being (as they must be) of the same height above the end of the index O, as is the height of the style N l, it is evident that on an equinoctial day the sun's rays will pass directly through the perforation of the piece R, if it be put in a position parallel to the plane of the ecliptic, or that of the clock; and also that the top of the shadow of the said style will fall exactly on the said hole. In this case the top of the style is at the least distance from the central point of R, and therefore may be represented by radius; while in any other position above or below, the distance will increase in proportion

tion to the fecant of the angle which the rays make with this firft or middle ray, that pafs by the top of the ftyle, and through the hole R.

Now it may be demonftrated, that on any day of the year, if the clock and its pedeftal be fo fixed that the line of XII be exactly in the meridian, and that the pofition of R in the fork be fuch that the fun's rays go directly through it, and the fhadow of the ftyle's top fall juft upon the hole; moreover, if the diftance of the center of the fpeculum S from the top of the ftyle *l* be made equal (by the pofitor) to the diftance of the central point of R therefrom; and, laftly, the tail of the fpeculum DE paffing through R; then if the clock be put into motion, the index N O fhall carry about the tail of the fpeculum in fuch a manner, that at all times of that day, when the fun can come upon the fpeculum, it will reflect the rays conftantly in one and the fame pofition and direction all the time without variation.

The machine thus conftituted, is placed in a box or cafe, and fet in a window with one fide open, expofed to the fun, and all the other parts clofe; fo that when the room is made dark, and the folar microfcope fixed to the fore-part of the box in which the helioftata is placed, juft againft the center of the fpeculum to receive the reflected horizontal beam, all the experiments of the darkened room are then performed as ufual.

This is a very ingenious conftruction of a folar microfcope-apparatus, but, we fear, too expenfive and troublefome for common ufe. However, it is eafy to fee that this machine is capable of being greatly reduced; fince it may be made to anfwer the end very well without a clock and the fpeculum may be glafs inftead of metal, and all fixed in one pedeftal. See the article MICROSCOPE.

HELIOTROPE, *heliotropium*, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla of which confifts of a fingle petal; the tube is of the length of the cup; the limb is plane, divided lightly into five fegments, and obtufe; the fmaller fegments ftand alternate, and are acute; the large are placed between; the mouth is clofed by five prominent fquamulæ, which bending toward one another, form a little ftar: there is no pericarpium; the calyx remains unaltered, and contains four oval acuminated feeds.

A decoction of this plant purges phlegm and bile. It is good againft the fting of ferpents: it confumes warts, and provokes the menfes, and the expulfion of the fœtus.

HELIOTROPE, in foffil hiftory, a hard bluifh-green jafper, with red variegations. See the article JASPER.

HELIX, in geometry, the fame with fpiral. See the article SPIRAL.

In architecture fome authors make a difference between the helix and the fpiral. A ftair-cafe according to Daviler, is an helix, or is helical, when the ftairs or fteps wind round a cylindrical newel; whereas the fpiral winds round a cone, and is continually approaching nearer and nearer its axis.

HELIX alfo fignifies the caulicoles, or little volutes, under the flower of the corinthian capital, called alfo urillæ.

HELIX, in anatomy, is the whole circuit or extent of the auricle outwards, in oppofition to which the inner protuberance anfwering thereto, is called anthelix. See the article EAR.

HELL, *gehenna, tartara, hades, infernus*, &c. the place of divine punifhment after death, in contradiction to heaven. See the article HEAVEN.

As all religions have fuppofed a future ftate of exiftence after this life, fo all have their hell or place of torment, in which the wicked are fuppofed to be punifhed. The hell of the antient heathens was divided into two manfions, the one called elyfium, on the right hand, pleafant and delightful, appointed for the fouls of good men; the other called tartara, on the left, a region of mifery and torment, appointed for the wicked. The latter was only hell in the prefent reftrained fenfe of the word. See the article ELYSIUM.

Of all the poets of antiquity, Virgil is the moft particular in his defcription of hell; having carried his hero thither, and given him a full view of thefe infernal regions: for an account of which we muft refer the reader to the fixth Æneid of that poet, where the many dreadful apparitions, as gorgons, harpies, chimæras, and the like, are ftrongly painted, and a defcription of Charon, the old ferryman of hell, his bufinefs, together with the officer of Minos and Radamanthus, two of the judges of hell, are very lively reprefented. The opening of the adamantine gate, difcovers to Æneas the inmoft receffes of tartara, or hell, which according

according to the poet is twice as deep as the earth is diftant from the fkies. Here Æneas fees various perfons condemned to punifhment, as alfo the different kinds and forms of torture which are fo numerous, that the poet concludes, *non mihi fi linguæ centum*, &c.

"Had I an hundred mouths, an hun-
"dred tongues,
"And throats of brafs infpired with
"iron lungs,
"I could not half thefe horrid crimes
"repeat,
"Nor half the punifhments thefe crimes
"have met." *Dryden.*

The antient philofophers were of opinion, that the infernal regions were at an equal diftance from all the parts of the earth; neverthelefs it was the opinion of fome, that there were certain paffages which led thither, as the river Lethe, near the Syrtes, and the acherufian cave in Epirus. At Hermione it was thought, that there was a very fhort way to hell; for which reafon, the people of that country never put the fare into the mouths of the dead to pay their paffage. Ulyffes, according to Homer, went by fea to the country of the Cimmerians, in order to go thither; and Æneas went by the lake of the cave of Avernus.

The Jews placed hell in the center of the earth, and believed it to be fituated under waters and mountains. According to them there are three paffages leading to it: the firft is in the wildernefs, and by that Korah, Dathan and Abiram defcended into hell; the fecond is in the fea, becaufe Jonah, who was thrown into the fea, cried to God out of the belly of hell; the third is in Jerufalem, becaufe it is faid the fire of the Lord is in Zion, and his furnace is in Jerufalem. They likewife acknowledged feven degrees of pain in hell, becaufe they find this place called by feven different names in fcripture. Though they believed that infidels, and perfons eminently wicked, will continue for ever in hell; yet they maintained, that no Jew, who is not infected with fome herefy, and has not acted contrary to the points mentioned by the Rabbins, will be punifhed therein for any other crime above a year at moft.

The mahometans believe the eternity of rewards and punifhments in another life. In the Koran it is faid, that hell has feven gates, the firft for the Muffulmans, the fecond for the Chriftians, the third for the Jews, the fourth for the Sabians, the fifth for the Magians, the fixth for the Pagans, and the feventh for the hypocrites of all religions.

Among Chriftians, there are two controverted queftions in regard to hell, the one concerns locality, the other the duration of its torments. The locality of hell, and the reality of its fire, began firft to be controverted by Origen. That father interpreting the fcripture account metaphorically, makes hell to confift not in external punifhments, but in a confcioufnefs or fenfe of guilt, and a remembrance of paft pleafures. Among the moderns, Mr. Whifton advanced a new hypothefis. According to him the comets are fo many hells appointed in their orbits alternately to carry the damned into the confines of the fun, there to be fcorched by its violent heat, and then to return with them beyond the orbit of faturn, there to ftarve in thefe cold and difmal regions. Another modern author not fatisfied with any hypothefis hitherto advanced, affigns the fun to be the local hell. As to the fecond queftion, *viz.* the duration of hell torments, we have Origen again at the head of thofe who deny that they are eternal; it being that father's opinion, that not only men, but devils, after a due courfe of punifhment fuitable to their refpective crimes, fhall be pardoned and reftored to heaven. The chief principle upon which Origen built his opinion, was the nature of punifhment, which he took to be emendatory, applied only as phyfic for the recovery of the patient's health. The chief objection to the eternity of hell torments among modern writers, is the difproportion between temporary crimes and eternal punifhments. Thofe who maintain the affirmative, ground their opinions on the fcripture accounts, which reprefent the pains of hell under the figure of a worm which never dies, and a fire which is not quenched; as alfo upon the words, "Thefe fhall go away into everlafting "punifhment, but the righteous into "life eternal."

HELLEBORE, *helleborus*, in botany, a genus of the polyandria polygynia clafs of plants, with a rofaceous flower, compofed of five or more roundifh and large petals: the fruit is compofed of feveral bicarinated capfules, containing a great number of roundifh feeds. See plate CXXXI. fig. 1.

The root of this plant is the true black hellebore of the fhops, which is a purge,

purge; but not a very safe one; being sometimes given in substance from ten grains to twenty. In tincture, it is principally used as an alterative, for attenuating the humours. It has been always famous in maniac cases, and is still given in them, tho' rather as an alterative than a purge: for at present, the use of black hellebore as a purge is out of doors; the chemical preparations of antimony and mercury having been found much more certain, and to answer as well all its purposes. The dose of the tincture is from 15 to 50 drops, which is given in hysteric cases, and obstructions of the viscera.

White HELLEBORE, in pharmacy, the root of the broad leaved veratrum. See the article VERATRUM.

White hellebore, given in powder or in infusion, is a very rough vomit; and, at present, is never used but when very desperate diseases call for such a remedy. It is a powerful sternutatory, and is sometimes used as such in soporose diseases; but the principal use made of it at present is externally, in unguents for the itch, among the common people.

HELLENISM, in matters of language, a phrase in the idiom, genius, or construction of the greek tongue.

This word is only used when speaking of the authors who writing in a different language, express themselves in a phraseology peculiar to the greek.

HELLENISTIC, or HELENISTIC LANGUAGE, that used by the grecian Jews who lived in Egypt and other parts where the greek tongue prevailed. In this language it is said the Septuagint was written, and also the books of the New Testament; and that it was thus denominated to shew that it was greek filled with hebraisms and syriacisms.

HELLENODICÆ, in grecian antiquity, the directors of the olympic games. See the article OLYMPIC.

HELLESPONT the entrance of the streights which divide Asia from Europe, and pass from the Archipelago to Constantinople. It is now called the Dardanels, and is about two miles wide.

HELM *of a ship*, is a piece of timber fastened into the rudder, which comes forward into the steerage, or place where the person at the helm steers the ship, by holding the whipstaff in his hand, which is joined to the helm. They begin however to be left off, steering-wheels being used in their room.

There are several terms in the sea-language relating to the helm; as, *bear up the helm*; that is, let the ship go more large before the wind. *Helm a mid-ship*, or *right the helm*; that is, keep it even with the middle of the ship. *Port the helm*, put it over the left side of the ship. *Starboard the helm*, put it on the right side of the ship.

HELMET, an antient defensive armour worn by horsemen both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front secured by bars, which was called the visor.

It is still used in heraldry by way of crest over the shield or coat of arms, in order to express the different degrees of nobility, by the different manner in which it is borne. Thus a helmet in profile, is given to gentlemen and esquires: to a knight, the helmet standing forward and the beaver a little open: the helmet in profile and open, with bars, belongs to all noblemen under the degree of a duke: and the helmet forward and open, with many bars, is assigned to kings, princes, and dukes.

There is generally but one helmet upon a shield; but sometimes there are two, and even three: if there be two, they ought to face each other; and if three, the middlemost should stand directly forward, and the other two on the sides facing towards it.

HELMINTHOLITHUS, in natural history, a name given by Linnæus to petrified bodies resembling worms.

Of these he reckons four genera. 1. Petrified lithophyta, found in the mountains of Sweden. 2. Petrified shells. 3. Petrified zoophytes. 4. Petrified reptiles. See LITHOPHYTA, SHELL, &c.

HELMONT, a town of the Netherlands, in the province of dutch Brabant, situated on the river Aa: east longitude 5° 40′, north latitude 51° 30′.

HELMSTAT, a town of Germany, in the circle of Lower Saxony, and dukedom of Brunswic: east long. 11° 15′, north lat. 52° 20′.

HELONIAS, in botany, a genus of the hexandria-trigynia class of plants, without any flower petals; the fruit is an oval berry, containing only one cell, in which is a single oval seed.

HELOTS, in grecian antiquity, the inhabitants of Helos, a town of Laconia, conquered by the Spartans; who made them all prisoners of war, and reduced them into the condition of slaves.

The freemen of Sparta were forbidden the exercife of any mean or mechanical employment, and therefore the whole care of fupplying the city with neceffaries, devolved upon the Helots: the ground was tilled, and all forts of trade managed by them, whilft their mafters, gentlemen like, fpent their time in all forts of manly exercifes. Notwithftanding the great ufefulnefs of the Helots, they were treated in the moft barbarous manner, and often murdered without any fhew of juftice. It was a thing common with the Spartans to force them to drink to excefs, and then lead them in that condition into their public halls, that their children might fee what a contemptible and beaftly fight a drunken man is. They made them dance uncomely dances, and fing ridiculous fongs; forbidding them exprefsly to ufe any that was ferious and manly.

HELPS, in the manege. To teach a horfe his leffon, there are feven helps or aids to be known: thefe are the voice, rod, bit or fnaffle, the calves of the legs, the ftirrups, the fpur, and the ground.

The helps are occafionally turned into corrections.

HELSINGFORD, a port-town of Sweden, fituated on the gulph of Finland, in 24° 6′ eaft long. and 60° 8′ north lat.

HELSINGIA, a province of Sweden, bounded by the Bothnic gulph on the eaft, and by Delecarlia on the weft.

HELSINGIC CHARACTER, a peculiar kind of character, found infcribed on ftones in the province of Helfingia: the runic and helfingic characters may be eafily transformed into each other.

HELSTON, a borough of Cornwall, nine miles fouth-weft of Falmouth: it fends two members to parliament.

HELVE, a term ufed among country people for the handle of a hatchet, pick-ax, mattock, or the like.

HELVETIC, fomething belonging to Helvetia, or Switzerland. See the article SWITZERLAND.

HELVOETSLUYS, a port-town of the United Netherlands, fituated in the ifland of Voorn, in the province of Holland, five miles fouth of the Briel: it is one of the beft harbours in Holland, and that to which the englifh packet always goes.

HELXINE, BUCK-WHEAT, in botany, a genus of the octandria-trigynia clafs of plants, the corolla of which is permanent, and confifts of a fingle petal, divided into five obtufe, erecto-patent fegments: there is no pericarpium, the corolla performs the office of it, and furrounds the feed, which is fingle, triquetrous, and acute.

HEM, in the ovens for baking calamine, a partition which feparates the hearth from the oven itfelf: it is open at top, to let the flame pafs over to bake the calamine.

HEMERO-BAPTISTS, a fect among the Jews, fo called becaufe they wafhed themfelves every day, making holinefs to confift in thefe daily ablutions.

They were pharifees in every thing, except that with the fadducees, they denied a refurrection. Probably thefe were the fect who found fault with our Saviour's difciples for eating with unwafhen hands. D'Herbelot tells us, that the difciples of St. John Baptift, who, in the firft ages of of the church, were called hemero-baptifts, and the number of whom is confiderable among the Jews, have fince that time formed a fect, or rather religion apart, under the name of mendai jahia.

HEMEROBIUS, in zoology, a genus of infects of the neureptera order, the characters of which are thefe: the palate is prominent, and has on each fide two tentacula: the wings, being four in number, are deflex and tumid.

To this genus belong the golden-eye, a large beautiful fly, fo called from the colour of its eyes; the formica-leo, and feveral other fpecies.

HEMEROCALLIS, DAY-LILLY, in botany, a genus of the hexandria monogynia clafs of plants, the corolla of which is of an infundibuliform figure; the tube is fhort; the limb is patent, and divided into fix fomewhat reflex fegments: the fruit is an ovato-trilobous, trigonal capfule, formed of three valves, and containing three cells: the feeds are numerous and roundifh.

HEMERODROMI, in grecian antiquity, centinels and guards appointed for the fecurity and prefervation of cities, and other places.

They went out of the city every morning, as foon as the gates were opened, and kept patrolling all day about the place: fometimes alfo making excurfions further into the country, to fee that there were no enemies lying in wait to furprize them.

HEMERODROMI were alfo a fort of couriers among the antients, who only travelled one day, and then delivered their packets or difpatches to a frefh man, who run his day, and fo on to the end of the journey

ney. See COURIER and EXPRESS.

HEMI, a word uſed in the compoſition of divers terms, ſignifying the ſame with ſemi, or demi, *viz.* one half; being an abbreviature of ἡμισυς, which ſignifies the ſame. The Greeks ſuppreſſed the laſt ſyllable of ἡμισυς, in the compoſition of words.

HEMICRANIA, in medicine, a ſpecies of head-ach, wherein only one half or ſide of the head is affected. See HEAD-ACH.

HEMICYCLE, in architecture, is defined by Daviler to be an arch forming a perfect ſemicircle. See the articles ARCH and BRIDGE.

To conſtruct ſuch an arch of hewn ſtone, they divide the hemicycle into a certain number of equal parts, and faſhion an equal number of vouſoirs, which will complete the arch: however, that there may be no joint in the middle, where the key-ſtone ſhould be, they always take care that the number of vouſoirs be an odd one.

HEMICYCLIUM, in antiquity, a part of the orcheſtra in the antient theatres: but Scaliger obſerves, that this part was only uſed, when ſome perſon was ſuppoſed to be juſt arrived from ſea, as in Plautus's Rudens.

HEMICYCLIUM alſo ſignified a kind of ſun-dial; being a concave ſemicircle, the upper cuſp of which looked to the north. On the middle of the hemicyclium ſtood a ſtyle, whereof the point that correſponded to the center of the hemicycle, repreſented the center of the earth; and its ſhadow, being projected on the concavity of the hemicycle, which repreſented the ſpace between the two tropics, pointed out not only the declination of the ſun, and the day of the month, but likewiſe the hour of the day.

HEMINA, in roman antiquity, a liquid meaſure which, according to Arbuthnot, was equal to half a wine-pint engliſh meaſure; its contents being 2,818 ſolid inches. See the article MEASURE.

HEMIOLIA, or HEMIOLIUS, among antient muſicians, a ſort of proportion now called ſeſquialteral. See the article SESQUIALTERAL.

HEMIONITIS, in botany, a genus of the cryptogamia-muſcorum claſs of plants, the fructifications of which are arranged into lines, ſometimes branched, often uniting with and interſecting one another.

HEMIOPE, in antiquity, a flute with ſmall holes. See the article FLUTE.

HEMIPLEGIA, or HEMIPLEXIA, among phyſicians, a palſy of one half of the body. See the article PALSY.

HEMISPHÆRIA, LADY-COW, in zoology, a genus of beetles, with clavated and entire antennæ; and whoſe thorax, with the exterior wings, which are marginated, conſtitutes an hemiſpheric figure. There are a great many ſpecies of lady-cows, the moſt common of which is that with reddiſh wings, and ſeven black ſpots on them; an inſect too well known to need farther deſcription. See the article COCCINELLA.

HEMISPHERE, *hemiſphærium*, in geometry, the half of a globe or ſphere, when it is ſuppoſed to be cut through its center in the plane of one of its great circles. Thus the equator divides the terreſtrial globe into the northern and ſouthern hemiſpheres: in the ſame manner the meridian divides the globe into the eaſtern and weſtern hemiſpheres; and the horizon into two hemiſpheres, diſtinguiſhed by the epithets upper and lower. See the articles SPHERE and GLOBE.

The center of gravity of an hemiſphere, is $\frac{5}{8}$ of the radius diſtant from the vertex.

HEMISPHERE is alſo uſed to denote a projection of half the terreſtrial globe, or half the celeſtial ſphere, on a plane, and frequently called planiſphere.

HEMISPHEROIDAL, in geometry, an appellation given to whatever approaches to the figure of an hemiſphere, but is not exactly ſo.

HEMISTICH, ἡμιστιχος, in poetry, denotes half a verſe, or a verſe not completed.

Of this there are frequent examples in Virgil's Æneid; but whether they were left unfiniſhed by deſign or not, is diſputed among the learned; ſuch are, *Ferro accincta vocat*, Æn. II. v. 614. And, *Italiam non ſponte ſequor*, Æn. IV. v. 361.

In reading common engliſh verſe, a ſhort pauſe is required at the end of each hemiſtich, or half verſe.

HEMITONE, in muſic, the ſame with a ſemitone, or half note. See TONE.

HEMITRITÆUS, among phyſicians, a kind of intermitting fever, being a ſemitertian. See FEVER and TERTIAN.

HEMLOCK, *conium*, in botany. See the article CONIUM.

Water HEMLOCK, *cicuta*. See CICUTA.

HEMP, *cannabis*, in botany. See the article CANNABIS.

Hemp is a uſeful plant, purchaſed at a dear

dear rate from foreigners, when it might be cultivated among ourfelves, to the great benefit of the nation in general. It delights in warm, fandy, or fomewhat gravelly foil; but it muft be fomewhat rich, and of a good depth. The beft feed is that which is brighteft, and retains its colour and fubftance in rubbing. Three bufhels will fow an acre; but the richer the land is, the thicker it muft be fown, and the poorer it is, the thinner. The time of fowing it, is from the latter end of March, to the end of April, according as the fpring falls out; but the earlier it is fown the better. If it be a dry feafon, great care muft be taken to preferve it from birds.

The firft feafon for gathering it is about Lammas, when a good part of it will be ripe; that is, the light fummer hemp which bears no feed, and is called fimble-hemp. When it is ripe the ftalks grow white, and the leaves fall downwards, turning yellow at the top: it muft then be pulled up, dried, bound up in bundles as big as may be grafped in both hands, and laid by for ufe. Care muft be taken not to break what is left ftanding, becaufe it is to grow till near Michaelmas before it will be fit to gather: this is ufually called karle-hemp. When it is gathered, lay it in the fun three or four days to dry, and then ftack or houfe it till the feed be threfhed out.

An acre of hemp, in the beft land, commonly yields about two or three quarters of feed, which, with the hemp unwrought, is often worth from 5 to 8 l. but if wrought, from 10 to 12 l. but the fimble-hemp is not worth above half as much as the other.

As to the method of preparing it, after the feeds are threfhed out of the heads, the ftalks are laid up in bundles and fteeped in a ftanding water, the cleaner it is the better; they are faftened to poles, and left to foak about fifteen days; and when the fubftance of the ftalk is almoft rotten, the bundles are taken out and well dried. But flax, inftead of being fteeped in water, is ufually expofed alternately to the moift air of the night, and the heat of the fun, by which means it receives a finer colour.

When hemp and flax are well penetrated and afterwards completely dried, they are bruifed by handfuls on a block, with a kind of mallet; all the bullen, which is the inward fubftance of the ftem, flies off in fhivers, by the force of the blows, and nothing remains in the hands of the beater but the thin bark in large threads, through the whole length of the ftem. This parcel of threads is afterwards hung on a perpendicular board, and bruifed with a wooden beetle, in order to fhake out all the little ftraws that may happen to remain of the bullen. All the grofs parts are now feparated from the ftem, and the threads of the bark receive their perfection from the comb or hatchel. The refufe of this combing, which confifts of all the threads which are too thick, is called tow, for the ufe of which fee the article Tow.

Hemp and flax are the materials of a variety of profitable manufactures; for befides linen, great quantities of ticken of all fineneffes, fail-cloth, incle, tape, facking, girtwip, cordage, twine, nets, and many other things are made of them: and they furnifh multitudes of other manufactures, which employ the poor, and bring, by their exports, profit to the nation. But as we are under the neceffity of importing very large quantities of hemp from foreign countries, the production of this article among ourfelves, and in our plantations, cannot be too plentifully cultivated, nor too highly encouraged.

For the laws relating to hemp and flax, fee the article Flax.

HEMPSTEAD, a market-town of Hartfordfhire, twenty-nine miles north-weft of London.

HEN, *gallina*, in ornithology, though ufed in a general fenfe to fignify any female bird, is more particularly reftrained to thofe of the order of gallinæ. See the article Gallinæ.

Hen bane, a plant called by botanifts hyofcyamus. See Hyoscyamus.

Hen-Harrier, in ornithology, the falco with a brown back, and a variegated, black, and brown tail. See the article Falco.

This is a confiderably large fpecies, and is equal to a well grown pullet in fize: the head is fmall, and fomewhat flatted at the top; the beak is large, and very robuft; it is broad and thick at the bafe, very much hooked, and extremely fharp at the point; the bafe of it is covered with a thick yellow membrane, in which are fituated the noftrils, and there are a kind of black hairs refembling whifkers.

HENDECAGON, in geometry, a figure that hath eleven fides, and as many angles.

In fortification, hendecagon denotes a place defended by eleven baſtions.

HENEBON, a town of Britany, in France, twenty-two miles north-weſt of Vanes.

HENLEY, a market-town of Oxfordſhire, ſituated on the river Thames, twenty miles ſouth-eaſt of Oxford, and thirty-five weſt of London.

HENLEY is alſo a market-town of Warwickſhire, ſeven miles ſouth-weſt of Warwick.

HEN-MOULD, among farmers, denotes a black ſpungy ſoil fitter for grazing than for corn.

In ſome places, indeed, they give the name of hen-mould to a rich black earth mixed with whitiſh ſtreaks, which is exceeding fertile.

HENNEBURG, a town of Germany, in the circle of Franconia, and the capital of the county of Henneburg: eaſt long. 10° 27′, and north lat. 50° 40′.

HENOTICON, in church-hiſtory, a decree or edict of the emperor Zeno, made at Conſtantinople, in the year 482, by which he pretended to reconcile all parties under one faith. It is generally agreed that Peter, patriarch of Alexander, and Acacius, patriarch of Conſtantinople, were the authors of this decree, and that their deſign was to compliment the emperor with a right of preſcribing regulations in matters of faith. The emperor, by this decree, arrogated to himſelf the right of being head of the church. Pope Simplicius, however, in the year 483, condemned the henoticon, and cited Acacius, the chief promoter of it, to appear before him at Rome; but it was not entirely ſuppreſſed till the year 518.

HENRICO, a county of the colony of Virginia, in North America.

HENRY, or CAPE-HENRY, the ſouth cape of Virginia, at the entrance of Cheſepeak-bay: weſt long. 74° 50′, north lat. 37°.

HENTING, among farmers, a method of ſowing immediately before the plough, by which it is pretended, a great deal of charge is ſaved. See SOWING.

HENTING-FURROWS, thoſe turned from each other at the bottom, in ploughing ridges. See the article PLOUGHING.

HEPAR, the LIVER, in anatomy. See the article LIVER.

HEPAR SULPHURIS, LIVER OF SULPHUR, in pharmacy, according to Quincy, is thus made; take of flowers of ſulphur, four ounces; ſalt of tartar in powder, an ounce and half: let them be well mixed together, and then melted in an earthen diſh, and kept conſtantly ſtirring till the maſs has acquired a red colour, care being taken that it does not catch fire.

HEPAR UTERINUM, in anatomy, the ſame with placenta. See PLACENTA.

HEPATIC, in medicine and anatomy, any thing belonging to the liver.

HEPATIC ALOE. See the article ALOE.

HEPATIC DUCT. See PORUS BILARIUS.

HEPATIC FLUX, a flux of the belly, of a very ſingular kind, and ſo rarely met with, that many authors have confounded the accounts of it with thoſe of dyſenteries and hæmorrhoidal fluxes. The ſigns by which it is known are theſe; the patient voids by the anus a liquid matter reſembling water in which raw fleſh had been waſhed; this is attended with pains and a ſenſe of weight and tenſion in the abdomen, and ſpaſtic motions about the loins, which ſometimes extend themſelves to the right ſide, toward the region of the liver. In ſome patients there is no ſenſation of any pain, or any particular ſymptom; and, in ſome, a teneſmus is conſtantly joined with this voiding of a bloody fluid.

The perſons ſubject to this diſeaſe are men, and thoſe chiefly between the age of eighteen and forty, for the moſt part; as alſo ſuch as are of a ſanguineo-phlegmatic habit, and of a ſedentary life.

The antients ſuppoſed this to be owing to a debility of the liver, which was not able, in this caſe, properly to attract or retain the blood; but it ſeems rather to belong to the hæmorrhoidal diſcharges, where, when pure and proper blood is not voided, this fluid comes in its place. This flux is not dangerous at the time; but when it is long continued, it will at length wear down the patient's ſtrength, and bring on bad habits.

This diſeaſe, according to Junker, is to be treated in the ſame manner as the hæmorrhoidal diſcharge, when obſtructed; and attemperating and abſtergent medicines are to be given with gentle purges: rhubarb, in doſes from a ſcruple to two or more, is to be given every day, for a long time: after this, nitre, tartarium vitriolatum, the alkaline ſalts of plants, as of worm-wood, with the abſorbent powders, ſuch as crab's eyes; and to theſe may be added decoctions of ſmall centaury, and the like herbs.

HEPATIC VEIN. See BASILICA.

HEPATICA, LIVER-WORT, in botany, a ſpe-

a ſpecies of anemone. See the article ANEMONE.

This plant is chiefly uſed in obſtructions of the liver and viſcera; as alſo in the ſcab, gonorrhœa, and fever.

HEPATITIS, in medicine, the name of an acute, continuous, and inflammatory fever, in which nature frequently and forcibly propels the humours through the liver, ſeemingly with an intent to reſolve and abſterge congeſtions and ſtaſes of the blood in that viſcus. See the article INFLAMMATION.

The hepatitis is diſtinguiſhed from all other fevers, by the ſeat of it in the liver, and by its being, of all other fevers, the moſt fatal. It differs, however, in degree, ſome caſes depending on a more ſuperficial, ſome on a deeper and more internal inflammation of the liver. It uſually ſeizes the patient with a chilneſs, which is ſucceeded by a violent heat, attended with an inſupportable thirſt: the patient perceives a ſevere and heavy pain on the right ſide, about the ſeventh or eighth rib; and is affected with a violent ſtreightneſs of the breaſt, and difficulty of breathing; the extremities are very apt to become cold; there are frequent nauſeas, and reachings to vomit, and a bilious matter is thrown up: the urine for the firſt days is reddiſh and thick, and about the fourth day uſually begins to depoſite a ſediment; the remaining part of it being however ſtill turbid; a very peculiar ſymptom is, that the patient frequently changes colour, being at times pale, and at other times browniſh or yellowiſh; the yellowneſs principally affecting the eyes and face. In caſes where the matter in the liver comes to a ſuppuration, all the ſymptoms become more ſevere; the heat is greater, the reſpiration more difficult, &c. Finally, the breaking of the tumour is known by a ſudden remiſſion of the pain, with a terrible faintneſs and lowneſs of the ſpirits, and a hectic; and when the matter is diſcharged into the cavity of the abdomen, it is known by the ſwelling of that part. The general cauſes of the hepatitis are a plethora and a derivation of blood into the liver, which there forms congeſtions and ſtaſes: this is brought on by violent motions of the body, by violent ſtrainings, by taking aſtringents in inflammatory fevers, and by driving back the matter in cutaneous eruptions; and, finally, by applying cold external medicines to the regions of the liver, or by cupping upon the part. Bleeding is very proper in the beginning of the diſeaſe; and after this, the bowels are to be kept gently open, not by ſtimulating purges, but by emollient clyſters, and the mildeſt and gentleſt cathartics. The mixtura ſimplex is a very valuable medicine given ſeveral times a day; and in the intermediate hours the following powder is to be given: take purified nitre, and tartarium vitriolatum, each two drams; crab's eyes, and the jaw of a pike reduced to powder and ſated with lemon juice, of each four ſcruples; diaphoretic antimony, a dram: the doſe of this mixed powder is a ſcruple. In the mean time the region of the liver ſhould be bathed externally with ſpirit of wine camphorated, impregnated with ſaffron. Above all things, reſt, moderate warmth, and a placid regimen are to be obſerved.

HEPATOSCOPIA, in antiquity, that branch of divination, which predicted future events by inſpecting the entrails of animals, but eſpecially the liver. See the article DIVINATION.

HEPATUS, in ichthyology, a ſpecies of labrus, with the lower jaw longer than the upper, a forked tail, and tranſverſe black lines on each ſide.

HEPHÆSTIA, in grecian antiquity, an athenian feſtival in honour of Vulcan, the chief ceremony of which was a race with torches.

It was performed in this manner: the antagoniſts were three young men, one of whom, by lot, took a lighted torch in his hand, and began his courſe; if the torch was extinguiſhed before he had finiſhed the race, he delivered it to the ſecond; and he, in like manner, to the third: the victory was his, who firſt carried the torch lighted to the end of the race: and to this ſucceſſive delivering of the torch, we find many alluſions in antient writers.

HEPSETUS, in ichthyology, a fiſh otherwiſe called atherina. It is a long and ſlender fiſh, with a forked tail, and its back variegated with black ſpots.

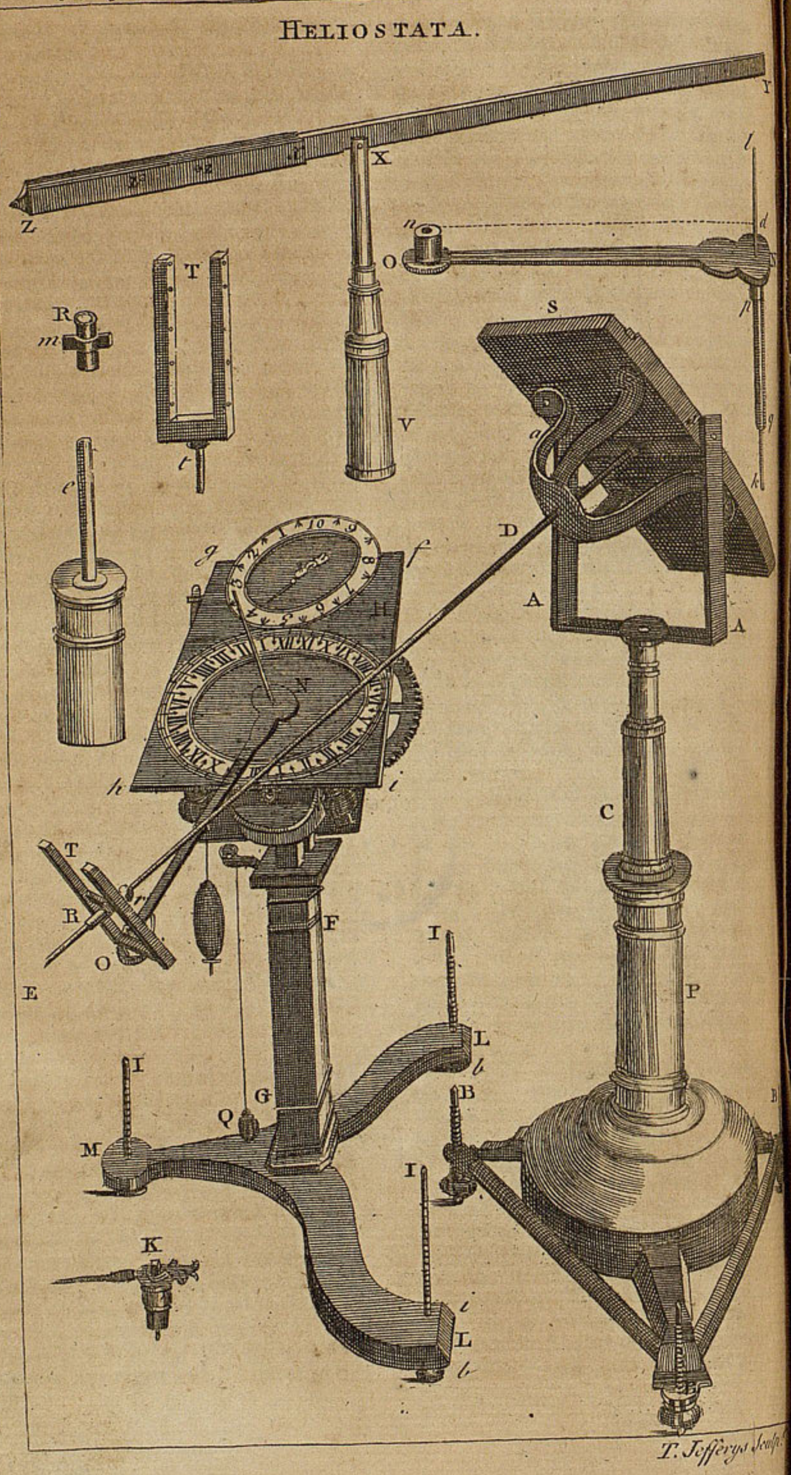
HEPTACHORD, in the antient poetry, ſignified verſes that were ſung or played on ſeven chords, that is, on ſeven different notes. In this ſenſe it was applied to the lyre, when it had but ſeven ſtrings.

One of the intervals is alſo called an heptachord, as containing the ſame number of degrees between the extremes.

HEPTAGON, in geometry, a figure conſiſting of ſeven ſides, and as many angles.

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T. Jefferys Sculp.

In fortification, a place is termed an heptagon, that has seven baftions for its defence.

HEPTAGONAL NUMBERS, in arithmetic, a fort of polygonal numbers, wherein the difference of the terms of the correfponding arithmetical progreffion is 5. One of the properties of thefe numbers is, that if they be multiplied by 40, and 9 be added to the product, the fum will be a fquare number. See NUMBER.

HEPTAMERIS, in mufic, the feventh part of a meris; being, according to M. Sauveur, the forty-third part of the octave. See the article OCTAVE.

HEPTANDRIA, in botany, a clafs of plants, the feventh in order, comprehending the plants that have hermaphrodite flowers, and feven ftamina in each. See FLOWER, STAMINA, &c.

Of this clafs there are only two genera, the efculus and trientalis. See ESEULUS and TRIENTALIS.

HEPTANGULAR, in geometry, an appellation given to figures which have feven angles.

HEPTARCHY, a government of feven perfons: alfo a ftate or country divided into feven kingdoms, and governed by feven independent princes; in which fenfe it is particularly applied to the government of South Britain, when divided amongft the Saxons.

HEPTATEUCH, the feven firft books of the Old Teftament, containing the pentateuch, or five books of Mofes, and the books of Jofhua and Judges.

HEPHTHEMIMERIS, in antient poetry, a verfe confifting of three feet and an half, or feven half feet.

It likewife denotes a cæfura after the third foot of a verfe. See CÆSURA.

HERACLEA, a port-town of Romania, in european Turky, fituated on the Propontis, fixty miles fouth-weft of Conftantinople; it was once a great city: eaft long. 28°, and north lat. 41°.

HERACLEIA, an antient feftival celebrated in honour of Hercules by feveral ftates of Greece.

HERACLEONITES, a fect of chriftians, the followers of Haracleon, who refined upon the gnoftic divinity, and maintained that the world was not the immediate production of the Son of God, but that he was only the occafional caufe of its being created by the demiurgus. The heracleonites denied the authority of the prophecies of the Old Teftament, maintaining that they were mere random founds in the air; and that St. John the Baptift was the only true voice, that directed to the Meffiah.

HERACLEUM, in botany, a genus of the pentandria-digynia clafs of plants, the general flower of which is difform and radiated; the fingle flowers of the difc confift each of five equal petals, but thofe of the radius confift of five unequal petals: the fruit is elliptic, compreffed, and ftriated on each fide in the middle, and contains two oval compreffed feeds.

To this genus belongs the fphondylium, or cow's parfnep of authors.

HERACLIDÆ, or *return of the* HERACLIDÆ *into Peloponefus*, in chronology, a famous epocha, that conftitutes the beginning of profane hiftory; all the time preceding that period being accounted fabulous.

This return happened in the year of the world 2862, an hundred years after they were expelled, and eighty after the deftruction of Troy.

HERAIA, an antient greek feftival obferved at Argos and fome other places, in honour of Juno, in which two proceffions were made to the temple of that goddefs, one by men in armour; and a fecond, in which the prieftefs of Juno was drawn in a chariot by white oxen, and on their arrival at the temple, they offered an hecatomb.

Another feftival of this name was celebrated every fifth year at Elis, at which fixteen matrons were appointed to weave a garment for the goddefs: there were alfo games, at which young virgins contended for the victory.

This name was alfo given to a folemn day of mourning kept at Corinth for Medea's children, who were buried in the temple of Juno Aftræa.

HERALD, an officer at arms, whofe bufinefs it is to declare war, to proclaim peace, to marfhal all the folemnities at the coronation, chriftening, marriage, and funeral of princes, to blazon and examine coats of arms, &c.

Heralds were formerly held in much greater efteem than they are at prefent, and were created and chriftened by the king, who pouring a gold-cup of wine on their head, gave them the herald-name; but this is now done by the earl-marfhal. They could not arrive at the dignity of herald without having been feven years pourfuivant; nor could they quit the office of herald, but to be made king at arms. See POURSUIVANT.

The

The three chief heralds are called kings at arms, the principal of which is Garter; the next is called Clarencieux, and the third Norroy; thefe two laft are called provincial heralds. See KING *at arms.*

Befides thefe there are fix other inferior heralds, *viz.* York, Lancafter, Somerfet, Richmond, Chefter, and Windfor; to which, on the coming of king Geo. I. to the crown, a new herald was added, ftyled Hanover herald; and another, ftyled Glocefter king at arms.

The kings at arms, the heralds, and four pourfuivants are a college or corporation, erected by a charter granted by Richard III. by which they obtained feveral privileges, as to be free from fubfidies, tolls, and all troublefome offices. See the article COLLEGE.

HERALDRY, the art of armoury and blazoning, which comprehends the knowledge of what relates to folemn cavalcades and ceremonies at coronations, inftalments, the creation of peers, nuptials, funerals, &c. and alfo whatever relates to the bearing of arms, affigning thofe that belong to all perfons, regulating their right and precedencies in point of honour, and reftraining thofe who have not a juft claim, from bearing coats of arms that do not belong to them. See BLAZONING, ARMS, SHIELD, &c.

HERAT, a city of Perfia, in the province of Choraffan: eaft long. 61°, and north lat. 34° 30′.

HERB, in pharmacy, an appellation given to the ftalks and leaves of plants, efpecially fuch as are flefhy and fucculent, and die away every year; but is alfo frequently ufed to denote the leaves alone.

The term herb, therefore, denotes the ftalks and leaves, in contradiftinction to the flowers, feeds, and roots. See PLANT, FLOWER, FRUIT, ROOT, &c.

Quincy gives the following directions for the gathering and preferving of herbs. They fhould be gathered juft when beginning to flower, as being then in greateft perfection; and this muft be done when there is no rain or dew upon them, otherwife they will be apt to turn black in drying. They ought to be dried in the fhade, as too great heat exhales their moifture too faft, and deftroys their beautiful verdure. The frefher they are ufed the better, though fome may be kept much longer than others. So long as the frefh colour they dry with continues, they may be trufted in medicine, but no longer. They are much better for decoction and diftillation when dried than green, becaufe their faline and volatile parts very difficultly mix with a menftruum, until their native phlegm be evaporated.

HERB-TRUELOVE, *herba paris*, in botany. See the article PARIS.

HERBAGE, in law, fignifies the pafture provided by nature for the food of cattle; alfo the liberty to feed cattle in the foreft, or in another perfon's ground.

HERBAL, in literary hiftory, a book that treats of the claffes, genera, fpecies, and virtues of plants. See the articles PLANT and BOTANY.

HERBAL is fometimes alfo ufed for what is more ufually called hortus ficcus. See the article HORTUS.

HERBALIST, the author of an herbal, or one who is fkilled in plants.

HERBE, in the french academies, a reward, or fome good ftuff, given to a horfe who has worked well in the manege.

HERBORG, a town in the circle of the Upper Rhine, and territory of Naffau: eaft long. 8° 15′, and north lat. 50° 36′.

HERCINIAN FOREST, a foreft which antiently extended the whole length of Germany and Bohemia, fome remains of which are ftill in being, *viz.* the Black Foreft, Odenwald near Heidelburg, Stigewald in Wurtfburg and Bamberg, and Hartfwald in Brunfwic.

HERCOLE, a port-town of Tufcany, on the coaft called Stato del Prefidii: eaft long. 12°, and north lat. 42° 25′.

HERCOLE is alfo a little ifland, near the town of the fame name.

HERCULES, in aftronomy, a conftellation of the northern hemifphere, faid to contain from 28 to 95 ftars.

HERCULES-PILLARS, in antiquity, a name given to mount Calpe in Spain, near Gibraltar, on the european fide of the ftreights, and mount Avila on the african fide.

HERCULEUS MORBUS, the EPILEPSY, in medicine. See EPILEPSY.

HERD, a company of eatable cattle of the larger fort, as cows, oxen, fwine, deer, &c. alfo of wild beafts.

HEREDITAMENTS, whatever immoveable things a perfon may have to himfelf and his heirs, by way of inheritance; and which, if not otherwife bequeathed, defcend to him who is next heir, and not to the executor, as chattels do.

This word extends to whatever is inheritable, be it real, perfonal, or mixed: and in conveyances, by the grant of hereditaments,

ments, manors, houfes, lands, rents, &c. will pafs.

HEREDITARY, an appellation given to whatever belongs to a family by right of fucceffion, from heir to heir.

Some monarchies are hereditary, and others elective; and fome hereditary monarchies defcend only to the heirs male, as in France; but others, to the next of blood, as in Spain, England, &c. Thus the dominions of the emperor are diftinguifhed into hereditary, which are thofe he derives from his anceftors by right of inheritance, and thofe he enjoys in quality of emperor by virtue of his election.

Hereditary is alfo applied to offices and pofts of honour annexed to certain families; thus the office of earl-marfhal is hereditary in the family of Howard.

Hereditary is alfo figuratively applied to good or ill qualities, fuppofed to be tranfmitted from father to fon: thus we fay, virtue and piety are hereditary virtues in fuch a family: and that in Italy the hatred of families is hereditary. And indeed the gout, the king's evil, madnefs, &c. may really be hereditary difeafes.

HEREFORD, the principal city of Herefordfhire, fituated on the river Wye, twenty-four miles north-weft of Glocefter, and one hundred and twenty weft of London: weft long. 2° 42′, and north lat. 52° 6′.

It fends two members to parliament.

HERESY, the crime of obftinately perfifting in opinions, that are contrary to the fundamentals of religion.

There is no law that exprefsly determines this offence, it being impoffible to fet down all the particular errors that may be faid to be heretical, and in relation to which fo many difputes have arifen: in general, however, thofe opinions that were fuppofed to be condemned by the fcriptures, or the four firft general councils, have been accounted herefy.

Herefy was antiently treafon, and punifhed by burning the offender; but he forfeited neither lands nor goods, becaufe the proceedings againft him were pro falute animæ. At prefent, all punifhments of death, and the old ftatutes which gave power to arreft or imprifon perfons for herefy, are repealed: though, by the common law, an obftinate heretic, being excommunicated, may be ftill imprifoned, on the writ de excommunicato capiendo, till he makes fatisfaction to the church. And perfons denying the truth of the chriftian religion, or the divine authority of the fcriptures, &c. are liable, for the fecond offence, to three years imprifonment, by 9 & 10 Will. III. cap. xxxii.

HERETIC, a general name for all fuch perfons, under any religion, but efpecially the chriftian, as profefs or teach religious opinions contrary to the eftablifhed faith, or to what is made the ftandard of orthodoxy. The laws both of church and ftate were antiently very fevere againft thofe who were adjudged to be heretics: the principal of which were, firft, the general note of infamy affixed to all heretics in common. Secondly, all commerce forbidden to be held with them. Thirdly, the depriving them of all offices of profit and dignity. Fourthly, the rendering them incapable of difpofing of their eftates by will, or of receiving eftates from others. Fifthly, impofing on them pecuniary mulcts. Sixthly, profcribing and banifhing them. Seventhly, inflicting corporal punifhment on them, fuch as fcourging, &c. before banifhment. Befides thefe laws, which chiefly affected the perfons of heretics, there were others which tended to the extirpation of herefy, fuch as thofe which forbad heretical teachers to propagate their opinions in public or private: thofe which denied the children of heretical parents their patrimony and inheritance, unlefs they returned to the church: fuch as ordered the books of heretics to be burnt. There were many other penal laws againft heretics, from the time of Conftantine to Theodofius juinor, and Valentinian III. But the few already mentioned may be fufficient to give an idea of the rigour with which the empire treated fuch perfons, who held or taught opinions contrary to the faith of the catholic church; whofe difcipline towards heretics was no lefs fevere than the civil laws: but fince thefe early times, the moft horrid deaths, and the moft excruciating tortures, have been invented.

For the laws of England in relation to heretics, fee the preceding article.

HERISSON, in fortification, a beam armed with a great number of iron-fpikes, with their points outwards, and fupported by a pivot, on which it turns.

Thefe ferve as a barrier to block up any paffage, and are frequently placed before the gates, and more efpecially the wicket-doors of a town or fortrefs, to fecure thofe paffages, which muft of neceffity be often opened and fhut.

HERK, a town of Germany, in the bifhoprick of Liege, fituated on a river of

of the fame name, near its confluence with the Demer: eaft long. 5° 20′, and north lat. 51°.

HERLING, a market-town of Norfolk, twenty miles fouth-weft of Norwich.

HERMÆ, among antiquarians, ftatues of the god Mercury, made of marble, and fometimes of brafs, without arms or feet, and fet up by the Greeks and Romans in the crofs-ways.

Antiquity likewife furnifhes us with compound hermæ, or ftatues of Mercury joined with fome other deity, as Herm-Athena, or Mercury and Minerva; Herm-Hercules, or Mercury and Hercules; Herm-Eros, or Mercury and Cupid: and fo of others.

HERMÆA, in antiquity, antient greek feftivals, in honour of the god Hermes, or Mercury. One of thefe was celebrated by the Pheneatæ, in Arcadia; a fecond by the Cyllenians, in Elis; and a third by the Tanagræans, where Mercury was reprefented with a ram upon his fhoulder, becaufe he was faid, in a time of plague, to have walked thro' the city in that pofture, and to have cured the fick; in memory of which, it was cuftomary at this feftival, for one of the moft beautiful youths in the city, to walk round the walls, with a ram upon his fhoulder.

A fourth feftival of the fame name was obferved in Crete, when it was ufual for the fervants to fit down at the table while their mafters waited: a cuftom which was alfo practifed at the roman faturnalia.

HERMANNIA, AFRICAN MARSH-MALLOWS, in botany, a genus of the monadelphi-pentandria clafs of plants, with a rofaceous flower, the petals of which are femitubular at the bafe; the fruit is a roundifh capfule, containing a great many fmall feeds.

HERMANSTAT, the capital city of Tranfilvania, fubject to the houfe of Auftria: eaft long. 24°, north lat. 46° 32′.

HERMAPHRODITE, a perfon of both fexes, or who has the parts of generation both of male and female.

It is now generally allowed, that there is no fuch thing as a true hermaphrodite; moft, if not all thofe who pafs for fuch, being mere women, whofe clitoris is grown to an enormous fize, and the labia pudendi become unufually tumid.

Among the infect-clafs of animals, indeed, hermaphrodites are very frequent: fuch are worms, fnails, leeches, &c.

HERMAPHRODITE FLOWERS, among botanifts. See FLOWER.

HERMATHENA, among antiquarians, a ftatue reprefenting Mercury and Minerva both in one. See HERMÆ.

HERMES, or HERMÆ. See HERMÆ.

HERMETIC, or HERMETICAL, an appellation given to whatever belongs to chemiftry, from Hermes Trifmegiftus, who is fuppofed to have been its inventor.

HERMETICAL PHILOSOPHY, that which undertakes to folve the various phænomena of nature, from the chemical principles, falt, fulphur, and mercury.

HERMETICAL SEAL, among chemifts, a method of ftopping glafs-veffels, ufed in chemical operations, fo clofely, that the moft fubtle fpirit cannot efcape through them.

It is commonly done by heating the neck of the veffel in a flame, till ready to melt, and then twifting it clofely together with a pair of pincers. Or, veffels may be hermetically fealed, by ftopping them with a glafs plug, well luted; or, by covering the veffel with another ovum philofophicum.

HERM-HARPOCRATES, in antiquity, a compound ftatue of Mercury and Harpocrates. See the article HERMÆ.

HERMIT, a devout perfon retired into folitude to be more at leifure for contemplation, and to difencumber himfelf from the affairs of the world.

An hermit is not reputed a religious, unlefs he has made the vows.

Paul the hermit is ufually reckoned the firft: though St. Jerom at the beginning of the life of that faint, fays it is not known who was the firft. Some go back to St. Anthony, fome to John the Baptift, and others to Elias. However, feveral of the antient hermits, though they lived in defarts, had neverthelefs numbers of religious accompanying them.

There are alfo feveral orders and congregations of religious diftinguifhed by the title of hermits; as the hermits of St. Auguftin, of St. John the Baptift, of St. Jerom, of St. Paul, of St. James de Montlio, of St. William, of St. Benedict of Montefabalo, &c.

HERMIT, in zoology, the long-tailed fquilla, with a foft tail, and the right claw the largeft. See the article SQUILLA.

This grows to two inches and a half in length; the legs are flender and long, and the anterior ones have claws on them like the common crabs.

HERMODACTYLS, in pharmacy, a root fuppofed to be that of the plant colchicum. See the article COLCHICUM.

Hermodactyls are brought us from Egypt and Syria, where the people eat them to make themselves fat. They use them medically, while fresh and just taken out of the earth, as a vomit and purge. The dried roots, as we have them in the shops, are a gentle purge, and have the credit of being peculiarly good in rheumatic disorders. The dose in powder is from a scruple to a dram, or more, but they are so weak a purge as seldom to be given alone: their proper correctives are the spices, ginger, cloves, and the like.

HERMON, a mountain on the east of Syria and Palestine, in Asia.

HERNANDIA, in botany, a genus of plants, the characters of which are not perfectly ascertained; the corolla of the male as well as the female flower, is divided into six segments: there is no pericarpium, the cup is very large, inflated and roundish, and intire at the mouth: the seed is an oval, sulcated, unilocular nut; the nucleus is globose.

HERNGRUNT, a town of Upper Hungary, situated north of Buda, near the Carpathian mountains: east long. 19° 20′ north lat. 48° 47′.

HERNIA, in medicine, a preternatural tumour formed in the abdomen, particularly in the navel, inguen, and scrotum, by a protuberance of the intestines or omentum, and usually known by the name of rupture.

These tumours differ first, according to their place or situation: those formed at the navel are called omphalocele, or exomphalus. See EXOMPHALUS.

A hernia in the groin is called bubonocele, and that of the scrotum, oscheocele, &c. See the article BUBONOCELE and OSCHEOCELE, &c.

Hernias are also distinguished from the body or surface contained in, or forming, the tumour: when from a protuberance of the intestines, a hernia is termed enterocele; when from the omentum, epiplocele; if from flatuses, pneumatocele; and if from water, hydrocele, &c. See the articles ENTEROCELE, EPIPLOCELE, PNEUMATOCELE, HYDROCELE, &c.

Hernias are also distinguishable from circumstances less remarkable, as from the size, being either small, large, or enormous; from their consistence, being either hard, soft, fixed or moveable, capable of being returned into the abdomen, or not; which latter are called adhesive ruptures: sometimes the parts prolapsed are so confined by stricture and inflammation, that the flatus and fæces cannot be returned, which kind of ruptures are called incarcerated: some are attended with pain; others without; or with sickness, vomiting, and other bad symptoms.

HERNIA HUMORALIS, a painful and inflammatory tumour, of one or both testicles, arising generally from a suppression of a virulent running in a gonorrhœa, or from too strong and stimulating cathartics, especially if the patient happens to take the least cold during their operation. See GONORRHOEA.

The cure of this symptom, according to Turner, must commence with bleeding; a bag-truss must be immediately provided, which may support the weight of the tumour, and contain and secure the proper applications: among which none excels a cataplasm of bean-meal, with simple oxymel; adding to it a little of the oil of roses, or ointment of elder, to preserve it from hardening and drying. During these applications, forbear all restringent or balsamic medicines, and purge the patient briskly with calomel and pilulæ ex duobus: but particular care must be taken that he gets no cold, by which method the swelling is usually in a few days dispersed, and the running always appears, which must be carried off by the same, or the like cathartics repeated at proper intervals. But if, notwithstanding, the pain and fluxion still increase with inflammation, threatening an abscess, the patient must be vomited with the turpeth mineral; such intervals being observed as may prevent any soreness of his chops, till the tumour subsides: then purge off the reliques: when, if any schirrhous hardness should remain, you may endeavour to disperse it with the emplastrum diasulphuris, the emplastrum de ranis cum mercurio & de cicuta cum ammoniaco, ex ammoniaco, the diagalbanum; or with suffumigation with vinegar.

HERNIARIA, RUPTURE-WORT, in botany, a genus of the petandria-digynia class of plants, having no corolla: the fruit is a small capsule placed in the bottom of the cup, covered, and hardly splitting; the seed is single, ovato-acuminated, and smooth.

This plant is of a refrigerating and drying quality. Its principal use is in curing an hernia; in wasting the stone in

in the kidneys, and bladder; in inciding mucofities of the ftomach and other parts, and bringing them away; in evacuating bile and water, and confequently curing the jaundice.

HERO, in the antient mythology, a great and illuftrious perfon, of a mortal nature, though fuppofed by the populace to partake of immortality; and, after his death, placed among the number of the gods.

Heroes were perfons partly of divine and partly of human extraction, being begot between a deity and a mortal, and coincides with what we otherwife call a demi-god; fuch was Hercules, who was the fon of Jupiter by Alcmena: accordingly Lucian defcribes a hero to be a medium between a god and a man, or rather a compofition of both.

HERO is alfo ufed in a more extenfive fenfe for a great, illuftrious, and extraordinary perfonage; particularly in refpect of valour, courage, intrepidity, and other military virtues.

F. Bouhours makes this diftinction between a hero and a great man, that the former is more daring, fierce, and enterprizing; and the latter more prudent, thoughtful and referved. In this fenfe we fay, Alexander was a hero, and Julius Cæfar a great man.

HERO *of a poem, or romance,* is the principal perfonage, or character therein. See the article CHARACTER.

The hero of the Iliad is Achilles; of the Odyffee, Ulyffes; of the Æneid, Æneas; of Taffo's Jerufalem, Godfrey of Bulloign; of Milton's Paradife Loft, Adam; though Mr. Dryden will have the devil to be Milton's hero, in regard he gets the better of Adam, and drives him out of Paradife.

Many of the critics find fault with the hero of the Æneid, for being too delicate, wanting the fire, firmnefs, and uncontroulable fpirit, remarkable in the hero of the Iliad. Piety, tendernefs, and fubmiffion to the gods, are virtues of the middle clafs of mankind; they do not ftrike enough for a hero who is to be the inftrument of fuch notable exploits. In anfwering to this, F. Boffu obferves, that Æneas's character was not to be formed on the model either of Achilles or Ulyffes; nor to be of the fame kind with them, as the fable and defign of the Æneid were very different from thofe of the Iliad and Odyffee. Virgil's defign was to perfuade the Romans to receive a new form of government, and a new mafter; who muft have all the qualities requifite for the founder of a ftate, and all the virtues which make a prince beloved.

Virgil was reftrained in his choice; his hero was to be of the genius of Auguftus. The characters of Homer's two heroes, as being directly contrary to his defign, he has thrown upon Turnus and Mezentius, who are the counter-parts to his hero. It is difputed whether it be neceffary, that the hero of an epic poem be a good and virtuous man. Boffu maintains the negative. Between a hero in morality, and a hero in poetry, the fame diftinction may be made as between moral and poetical goodnefs. Hence, as the manners of Achilles and Mezentius are poetically as good as thofe of Ulyffes and Æneas, fo thefe two cruel and unjuft men are as regular poetical heroes, as thefe two juft, wife, and good men. Whatever Ariftotle may fay in his book of morality, in his poetics he fpeaks another language. The hero of a poem, he obferves, muft neither be good nor bad, but between both: he muft not be fuperior to the reft of mankind by his virtue and juftice, nor inferior to them by his crimes and wickednefs. In effect, reafon, the nature of the poem, which is a fable, the practice of Homer, and the rules of Ariftotle and Horace agree that it is fo far from being neceffary, that a hero be a faultlefs man, that it is not neceffary he be an honeft man.

It is likewife difputed, whether, the cataftrophe is neceffarily to leave the hero happy, or whether it be allowable to leave him unhappy.

The general practice of the heroic poets ftand for the affirmative. In tragedy, according to Ariftotle unhappy cataftrophes are preferable to happy ones, and always much better received among the antients.

It is otherwife in the epopœia; but yet this does not exclude all unhappy conclufions. If the poet propofed his hero as a pattern of perfection for imitation, the misfortunes falling on him would fuit very ill with the defign; but this was doubtlefs the fartheft thing from the intentions of the great mafters of the epopœia. The only reafon perhaps for this uniform practice of the poets is, that an epic poem containing an action of more extent than that of tragedy, the reader would not be fo well fatisfied if, after



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after fo many difficulties as the hero is brought to ftruggle with, he fhould not at laft be brought off, but perifh miferably.

HEROIC, fomething belonging to a hero, or heroine: thus,

HEROIC AGE, that age or period of the world wherein the heroes are fuppofed to have lived. The heroic age coincides with the fabulous age.

HEROIC POEM, that which defcribes fome extraordinary enterprize; being the fame with epic poem. See EPIC.

HEROIC VERSE, that wherein heroic poems are ufually compofed; or it is that proper for fuch poems. In the greek and latin, hexameter verfes are ufually denominated heroic verfes, as being alone ufed by Homer, Virgil, *&c.* See the article HEXAMETER.

Alexandrine verfes of twelve fyllables were formerly called heroic verfes; but later writers ufe verfes of ten fyllables.

HEROIN, a woman of an heroic fpirit, or who makes the principal perfonage in an heroic poem. See HERO and POEM.

HERON, in ornithology, a bird of the ardea-kind, with a hanging creft.

The common heron is a tall bird, meafuring more than four feet from the point of the beak to the tip of the toes. Its head is covered with fhort white feathers; only from the hinder parts, there hangs a creft of very long black feathers; the upper part of its body is of a dufky bluifh grey; the under part white, and the thighs yellowifh.

The afh coloured heron from Hudfon's Bay differs from the common heron, in being fomething bigger, of a browner afh-colour on its back, and in having no white feathers on its forehead. See plate CXXXI. fig. 2.

HERPES, in medicine, a bilious puftle, which breaking out in different manners upon the fkin, accordingly receives different denominations.

If they appear fingle, as they frequently do in the face, the bafe is inflamed, and the top pointed; and having difcharged a drop of matter, the rednefs and pain go off, and they dry away. There is another fort more corrofive and of greater malignity, when a clufter of puftles rife in a ring, accompanied with fmart, and fometimes with great itching: this fpecies is termed ferpigo, and vulgarly the tetter, or ring-worm. It feizes the face, hands, and other parts of the body, is of an obftinate nature, eating into the fkin; and forfaking the place where it firft appears, it fpreads its taint into the adjacent parts. It neither forms matter, nor comes into digeftion; but when rubbed, will fometimes emit a thin, fharp, watery, humour, and excites fmart, heat, and itching.

Another kind of this difeafe appears in large clufters upon the neck, breaft, loins, hips, and thighs, attended with a flight fever and inflammation: the heads are white and mattery, which are fucceeded by a fmall round fcab, refembling millet-feed, whence its name of herpes miliaris; and is commonly called fhingles. Another fpecies, from its degree of virulence and corrofion, is named herpes exedens, or hepes depafcens. See the article ULCER.

The fimple bilious puftle, which rifes in the face, requires but little affiftance from medicine; for though it burns, fmarts, or itches a day or two, yet it naturally comes to a head, foon dies, and difappears.

The ferpigo is fometimes very difficult to be exterminated, and after it appears dead, it will at certain feafons of the year, obftinately break out again.

Tho' bleeding at firft is by fome condemned, yet repeated purging, efpecially with cholagogue medicines is univerfally approved: thefe not fucceeding, recourfe muft be had to mercurials, efpecially if there be the leaft fufpicion of any old venereal taint remaining in the blood. Having removed the cacochymy, the phyfician may proceed to topics. Ambrofe Paré, after a general evacuation, prefcribes the following. Take of powder of oak-galls, pomegranate-peel, balauftines, and armenian bole, each half an ounce; of rofe-water, half an ounce; of the fharpeft vinegar, half an ounce; of goofe-greafe, and oil of myrtles, each fix drams; of turpentine, half an ounce: make up into an ointment for ufe. Barbet imputes the caufe of the herpes rather to the lymph, than to the bile and fait phlegm, blamed by the antients. In the miliary eruptions, called fhingles, great care muft be taken that the bilious cacochymy is purged off before the ufe of topics: the internal prefcription for this purpofe is the fame with that in the eryfipelas. See the article ERYSIPELAS.

When the puftles are all ripened, their heads may be cut off with a pair of

 fciffars,

fciſſars, and the humours abſorbed with a ſoft rag, to prevent farther corroſion. Then a cerate of oil and wax may be laid over the parts, and kept on with a bandage, to prevent the puſtles ſticking to the dry linen. See ERUPTION.

HERRING, in ichthyology, a ſpecies of clupea, with the lower jaw longeſt, and without any black ſpots. It is from five to eight inches in length, and between one and two in breadth. However, its ſize is far from being certain; ſince it varies not only on account of age, but according to the ſeas and places where it is caught. The back is of a duſky bluiſh colour, and is more blue in ſpring than any other times; the ſides and the belly are of a ſilvery white; the fin on the back ſtands near the middle, and is of a whitiſh colour, and has nineteen rays; the pectoral fins are whitiſh, ſtand low, and have each eighteen rays; the ventral fins are very ſmall and white; the pinna ani is near the tail, and has eighteen rays; the tail is of a greyiſh colour, forked, and furniſhed with eighteen rays.

We have been deſignedly particular in the deſcription of this uſeful fiſh; the manner of fiſhing and curing which is delivered under the article FISHERY.

Barrelling of HERRINGS. See the article *Herring* FISHERY.

HERRING BUSS, in naval affairs. See the article BUSS.

HERSE, in fortification, is a lattice or portcullice, made in the form of a harrow, and ſtuck full of iron ſpikes.

It is uſually hung by a rope, faſtened to a moulinet, which is cut in caſe of ſurprize, or when the firſt gate is broken with a petard, to the end that it may fall and ſtop up the paſſage of the gate, or other entrance of a fortreſs.

Theſe herſes are alſo often laid in the roads, with the points upwards, to incommode the march both of the horſe and infantry.

HERSILLAN, in the art of war, is a ſtrong plank or beam, about ten or twelve feet long, ſtuck full of ſpikes on both ſides, and alſo uſed to incommode the march of the infantry or cavalry.

HERSTAL, a town of Germany, in the biſhopric of Liege, ſituated three miles north of the city of Liege: eaſt long. 5° 36′ north lat. 50° 42′.

HERTFORD, or HARTFORD. See the article HARTFORD.

HERWERDEN, a town of Weſtphalia, ſubject to the king of Pruſſia; and remarkable for its proteſtant-nunnery: eaſt longitude 8° 15′, and north latitude 52° 12′.

HESDEN, a town of Artois, near the confines of Picardy, and twenty miles ſouth-weſt of St. Omers.

HESPER, *heſperus*, in aſtronomy, an appellation given to the planet Venus, when ſhe ſets after the ſun. See VENUS.

HESPERIDES, in antiquity, the daughters of Heſperus, brother of Atlas, who kept a garden full of golden apples, guarded by a dragon: but Hercules having laid the dragon aſleep, ſtole away the apples. Others ſay, that they kept ſheep with golden fleeces that were taken away by Hercules.

Some think the heſperides were the daughters of a rich merchant of Miletus, who, on account of their beauty, were guarded by a man called Dragon; and that Hercules, by killing or bribing him, got them away.

HESPERIDES was alſo a name antiently given to the Cape Verd Iſlands. See the article *Cape* VERD.

HESPERIS, DAME'S VIOLET, in botany, a genus of the tetradynamia ſiliquoſa claſs of plants, the corolla of which conſiſts of four cruciform petals, of an oblong figure, of the length of the cup, a little reflex, and ending in ſmall ungues: the fruit is a long pod, plane, compreſſed, ſtriated, bilocular, bivalve, containing ſeveral oval, compreſſed ſeeds.

This plant is antiſcorbutic, and diaphoretic, and very ſerviceable in the aſthma, cough, and convulſions: the outward uſe of it is recommended againſt inflammations, cancers, a gangrene, ſphacelus, and contagious diſeaſes.

HESSE-CASSEL landgraviate, including Wetteravia, is a circle of the Upper Rhine, bounded by Weſtphalia and Brunſwic on the north; by Franconia and Saxony on the eaſt; by the river Maine on the ſouth, and by another part of Weſtphalia, and the electorate of Mentz and Triers on the weſt: it is ſubject to the king of Sweden.

HESSE-DARMSTAT, is bounded by the river Maine, which divides it from Heſſe-Caſſel on the north; by the ſame river on the eaſt; and by the Palatinate on the ſouth and weſt.

HETEROCLITE, among grammarians, one of the three variations in irregular nouns;

nouns, and defined by Mr. Ruddiman, a noun that varies in declenſion; as *hoc vas, vaſis*; *hæc vaſa, vaſorum.*

Other grammarians take the word heteroclite in a larger ſenſe, applying it to all irregular nouns. See ANOMALOUS.

The heteroclite nouns properly ſo called, or, according to the definition, are only three, *viz. vas, jugerum,* and *domus.*

HETERODOX, in polemical theology, any thing contrary to the faith and doctrines of a true church.

HETERODROMUS VECTIS, in mechanics, a lever, wherein the fulcrum, or point of ſuſpenſion, is placed between the power and the weight. See LEVER.

In this kind of lever, the weight is elevated, or raiſed, by the deſcent of the power, and *vice verſa.*

HETEROGENEITY, in phyſiology, that quality or property of bodies, which denominates a thing heterogeneous. See the next article.

The word is alſo uſed for the heterogeneous parts themſelves. In which ſenſe the heterogeneities of a body are the ſame thing with the impurities thereof.

Heterogeneity is a word of a very lax ſignification, and is brought by the chemiſts to ſerve almoſt for any thing they do not underſtand, ſo that the diſagreement or inaptitude to mixture in any body is imputed to the heterogeneity of their parts.

HETEROGENEOUS, or HETEROGENEAL, ſomething that conſiſts of parts of diſſimular kinds, in oppoſition to homogeneous. See HOMOGENEOUS.

HETEROGENEOUS, in mechanics, ſuch bodies whoſe denſity is unequal in different parts of their bulk; or they are ſuch whoſe gravities in different parts are not proportionable to the bulks thereof: whereas bodies equally denſe or ſolid in every part, or whoſe gravity is proportionable to their bulk, are ſaid to be homogeneous.

HETEROGENEOUS LIGHT, is, by Sir Iſaac Newton, ſaid to be that which conſiſts of rays of different degrees of refrangibility: thus the common light of the ſun or clouds is heterogeneous; being a mixture of all ſorts of rays.

HETEROGENEOUS NOUNS, one of the three variations in irregular nouns; or ſuch as are of one gender in the ſingular number, and of another in the plural, as *hoc cælum, hi cæli.* Heterogeneous, under which are comprehended, mixed nouns, are ſix-fold, 1. Thoſe which are of the maſculine gender in the ſingular number, and neuter in the plural as *hic tartarus, hæc tartara.* 2. Thoſe which are maſculine in the ſingular number, but maſculine and neuter in the plural, as *hic locus, hi loci, & hæc loca.* 3. Such as are feminine in the ſingular number, but neuter in the plural, *hæc carbaſus, & hæc carbaſa.* 4. Such nouns as are neuter in the ſingular number, but maſculine in the plural, as *hoc cælum, hi cæli.* 5. Such as are neuter in the ſingular, but neuter and maſculine in the plural, as *hoc raſtrum*; *hi raſtri, & hæc raſtra*; and, 6. Such as are neuter in the ſingular, but feminine in the plural number, as *hoc epulum, hæ epulæ.*

HETEROGENEOUS NUMBERS, mixed numbers conſiſting of integers and fractions. See INTEGER and FRACTION.

HETEROGENEOUS QUANTITIES, are thoſe which are of ſuch different kinds, as that one of them taken any number of times, never equals or exceeds the other.

HETEROGENEOUS SURDS, are ſuch as have different radical ſigns, as $\sqrt[2]{aa}$, $\sqrt[5]{bb}$, $\sqrt[3]{9}$, $\sqrt[7]{18}$, &c. See SURD.

If the indices of the powers of the heterogeneous ſurds be divided by their greateſt common diviſor, and the quotients be ſet under the dividends; and thoſe indices be multiplied croſswiſe by each others quotients; and before the products be ſet the common radical ſign $\sqrt{}$, with its proper index; and if the powers of the given roots be involved alternately, according to the index of each others quotient, and the common radical ſign be prefixed before thoſe products, then will thoſe two ſurds be reduced to others, having but one common radical ſign. As to reduce

$$\sqrt[2]{aa} \text{ and } \sqrt[4]{bb}$$

$$2)\sqrt{aa}\ (2\ \sqrt[4]{bb}\ {}^{1}\!\times^{2}$$

$$\sqrt[4]{bb}\ \sqrt[4]{aaaa}$$

HETEROPYRÆ, in natural hiſtory, a genus of foſſils, of the claſs of the ſiderochita, compoſed of various cruſts, ſurrounding a nucleus of a different ſubſtance from themſelves, and often looſe and rattling in them. See the article SIDEROCHITA.

Of this genus Dr. Hill reckons ſeven ſpecies. 1. The hard heteropyra, with brown and purpliſh cruſts, and a whitiſh green nucleus, being a very beautiful foſſil of a ſmooth equal texture, conſiderably compact and cloſe, generally determinate and regular in ſhape and ſize,

in

in form of an oblong oval figure, and about an inch in length, and half an inch in diameter. 2. The rough purpliſh heteropyra, containing a large nucleus of a very light earth. 3. The miſhapen heteropyra, with ferrugineous, red, and duſky, yellow cruſts, and a greeniſh, white nucleus. 4. The yellow, brown, and black cruſted heteropyra, with a whitiſh nucleus, being about four inches in length, and three in breadth, and two and a half in thickneſs, of an oblong form, a cloſe compact texture, and very heavy. 5. The yellow, ferrugineous, and purpliſh-cruſted heteropyra, with a pale yellow nucleus, from four to twelve inches in length, and about the third of its length in breadth, and nearly the ſame in thickneſs. 6. The coarſe, yellow, and brown heteropyra, with a browniſh yellow nucleus of an orbicular form, and between one and two inches in diameter. 7. The coarſe heteropyra, with brown, black, and orange-coloured cruſts, and a yellow nucleus, being of an oblong form, and about an inch and a half in length.

HETEROSCII, in geography, a term of relation denoting ſuch inhabitants of the earth as have their ſhadows falling but one way, as thoſe who live between the tropics and polar circles, whoſe ſhadows at noon, in north latitude, are always to the northward; and in ſouth latitude, to the ſouthward.

Thus we who inhabit the northern temperate zone, are heteroſcii with regard to thoſe who inhabit the ſouthern temperate zone, and they are heteroſcii with reſpect to us. Hence it follows, that only the inhabitants of the two temperate zones are heteroſcii, though in reality there is always one part of the torrid zone whoſe inhabitants are heteroſcii with reſpect to thoſe of the reſt, and with regard to thoſe of one of the temperate zones, except at the time of the ſolſtice, and even at this time all of the torrid zone are heteroſcii with regard to thoſe of one of the temperate zones; but as the people of the torrid zone have their ſhadows now on this, and then on that ſide, they are called amphiſcii. See AMPHISCII.

HETEROUSIANS, a name compoſed of ἕτερος, other, and οὐσία, ſubſtance, being given to a ſect of Arians, who did not believe that the ſon of God was of a ſubſtance like to that of the father, which was the opinion of another branch of the Arians, who were from thence called hemoouſians; but that he was of another ſubſtance, different from that of the father.

HEUCHERA, in botany, a genus of the pentandria-digynia claſs of plants, the corolla whereof conſiſts of five petals inſerted into the edge of the cup; they are of the length of the cup, and of an ovato-linear figure: the fruit is an ovato-acuminated capſule, ſemibifid, terminating in two reflex points, and containing two cells: the ſeeds are numerous and ſmall.

HEW HOLE, in ornithology, a name given to the wood-pecker, from its making holes in trees.

HEXACHORD, in antient muſic, a concord called by the moderns a ſixth.

Guido divides his ſcale by hexachords, and there are ſeven contained in it, three by B *quadro*, two by B *natural*, and two B *molle*; and it is for this reaſon that he divided his ſcale into ſix columns, in which he diſpoſed the hexachords. See the article GAMUT.

The hexachord is two-fold, greater and leſs. The greater hexachord is compoſed of two greater tones, and two leſs, and one greater ſemitone, which make five intervals. The leſs hexachord is of two greater tones, one leſſer, and two greater ſemitones. See TONE, &c.

HEXAEDRON, or HEXAHEDRON. See the article HEXAHEDRON.

HEXÆDROSTYLA, in natural hiſtory, a genus of foſſils conſiſting of cryſtalliform columnar ſpars, terminated at their ſummit by a pyramid, but adhering irregularly to ſome other body at their baſe. See the article SPAR.

There are three ſpecies of this genus of foſſils. 1. The ſlender hexædroſtylum, with a long pyramid, being ſo pure and clear a ſpar, and ſo much of the ordinary figure of the hexangular cryſtal, that there is no doubt but it has often been miſtaken for cryſtal: its moſt frequent ſize is nearly two inches in length, and a third of an inch in thickneſs, the pyramid being about one fourth of that length. 2. The hexædroſtylum, with a long irregular pyramid, being of a moderately equal, but ſomewhat coarſe and impure texture, and ſubject to ſpots of various earths and minerals, and often ſo altered by them, as not to be known, but by its figure, which it ever keeps regularly to: it is naturally of a duſky white, but moderately tranſparent, conſiderably heavy, and very ſoft. 3. The hexædroſtylum, with a very ſhort pyramid, being uſually of a very pure, clear, and

and fine texture, but ſometimes ſo de-baſed by earthy admixtures, that it becomes very coarſe, and frequently ſpotted, flawed and blemiſhed: it is of various ſizes, but about an inch and a half is its moſt frequent length, and with that the uſual proportion is about half an inch in thickneſs, and the pyramid ſeldom takes up more than one eighth of the length.

HEXAGON, in geometry, a figure of ſix ſides and angles; and if theſe ſides and angles be equal, it is called a regular hexagon.

The ſide of every regular hexagon, inſcribed in a circle, is equal in length to the radius of that circle. Hence, it is eaſy, by laying off the radius ſix times upon the circumference, to inſcribe an hexagon in a circle.

To deſcribe a regular hexagon on a given right line A B (plate CXXIX. fig. 3.) draw an equilateral triangle A C B, and the vertex C will be the center of a circle which will circumſcribe the hexagon required A B D E F G.

As 1 is to 1.672, ſo is the ſquare of the ſide of any regular hexagon to the area thereof, nearly.

HEXAGON, in fortification, is a place defended by ſix baſtions.

HEXAHEDRON, in geometry, one of the five platonic bodies, or regular ſolids; being the ſame with a cube. See CUBE.

HEXAMETER, *carmen hexametrum*, in antient poetry, a kind of verſe conſiſting of ſix feet; the firſt four of which may be indifferently, either ſpondees or dactyls; the fifth is generally a dactyl, and the ſixth always a ſpondee. Such is the following verſe of Horace:

1 2 3 4 5 6
Aut pro|deſſe vo|lunt, aut | dele|ctare po|etæ.

Or this one of Homer:

1 2 3 4 5 6
Σκήπτρω|μέν τοι|δῶκε τε|τίμῆ|σθαι πέρι|πάντων.

Sometimes indeed, a ſpondee conſtitutes the fifth foot; whence ſuch hexameter verſes are called ſpondaic; as in this of Virgil.

1 2 3 4 5
Cara De|um ſobo|les ma|gnum Jovis|incre-|
6
mentum.

Epic poems, as the Iliad, Æneid, &c. conſiſt wholly of hexameter verſes; whereas elegies and epiſtles conſiſt uſually of hexameter and pentameter verſes, alternately.

Such hexameter verſes pleaſe moſt, wherein dactyls and ſpondees follow each other in an alternate order: and next to theſe, ſuch as abound moſt with dactyls, as:

1 2 3 4 5
Ludere | quæ vel|lem cala|mo per | miſit a-|
6
greſti
Adſpicis| ut veni|ant ad |candida|tecta co-|
lumbæ.

HEXANDRIA, in botany, a claſs of plants, the ſixth in order; comprehending all thoſe plants which have hermaphrodite flowers, and ſix ſtamina in each. See FLOWER and STAMINA.

To this claſs belong the narciſſus, garlic, daffodil, lilly, &c.

HEXAPLA, in church-hiſtory, a work publiſhed by Origin, containing a part of the Old Teſtament in the original hebrew, with ſeveral verſions of it in ſix columns; from whence it was called hexapla, or the ſix-fold edition.

HEXAPYRAMIDES, in natural hiſtory, a genus of ſpars formed into pyramids, compoſed of ſix ſides or planes, affixed to no column, but adhering to ſome ſolid body by the baſes of their pyramids. See the article SPAR.

HEXASTYLE, in architecture, a building with ſix columns in front.

HEXHAM, a market town of Northumberland, ſixteen miles weſt of Newcaſtle.

HEYDON, a borough town in Yorkſhire, thirty-ſeven miles ſouth-eaſt of York, and ſix miles weſt of Hull. It ſends two members to parliament.

HEYLINGENSTAT, a town of Germany in the circle of Upper Saxony; ſubject to the elector of Mentz: eaſt long. 10°, north lat. 51° 27′.

HEYLSHEM, a town of the Auſtrian Netherlands, in the province of Brabant, ſituated five miles ſouth of Tirlemont; eaſt long. 4° 55′, north lat. 50° 53′.

HEYRS, in huſbandry, young timber-trees uſually left for ſtandards, in the felling of woods or copſes.

HEYTSBURY a borough town of Wiltſhire, fourteen miles north-weſt of Saliſbury, ſends two members to parliament.

HIÆNA, or HYÆNA, in zoology. See the article HYÆNA.

HIATICULA, the SEA-LARK, in ornithology, a ſpecies of charadrius, with a black front, and a white line on it. See the article CHARADRIUS.

It is a very pretty bird, about the ſize of the common lark, or a little larger. The

upper

upper part of its body is grey, and the belly white.

HIATUS, properly ſignifies an opening, chaſm, or gap; but it is particularly applied to thoſe verſes, where one word ends with a vowel, and the following word begins with one, and thereby occaſion the mouth to be more opened, and the ſound to be very harſh.

The term hiatus is alſo uſed in ſpeaking of manuſcripts, to denote their defects, or the parts that have been loſt or effaced.

HIBISCUS, in botany, a genus of the monadelphia-polyandria claſs of plants, the corolla whereof conſiſts of five petals, vertically cordated, having one prominence of the apex greater than the other, and coaleſcing at the baſe: the fruit is roundiſh, and contains five cells: the ſeeds are kidney-ſhaped.

The ſeveral ſpecies of this plant are in engliſh called the chineſe-roſe, the abelmoſch, the bladder alcea, and the gum-leaved-ketmia.

The ſeeds of the abelmoſch were once kept in our ſhops, as a provocative and cordial; but they are now out of uſe.

HICUP, or HICCOUGH, in medicine, a ſpaſmodic affection of the ſtomach and diaphragm, ariſing from any thing that irritates and vellicates their nervous coats. When it proceeds from a ſlight error in diet, it will ſoon end ſpontaneouſly, or by drinking any thing which dilutes the acrid matter; but it is ſometimes of a more dangerous kind, and may proceed from a hurt of the ſtomach, poiſon, an inflammation of the ſtomach, inteſtines, diaphragm, bladder, or the reſt of the viſcera. Sometimes, immediately before death, it may proceed from gangrenes of the outward parts. In acute fevers, and chiefly the malignant, it is often fatal.

When it happens in old or weak people from a plentiful meal, eſpecially from hard and flatulent aliment, or from drinking cold liquors, a draught of generous wine, or a dram of any ſpirituous liquor, will generally take it away. Stomachic powders mixed with peruvian bark, and taken in generous wine, are alſo profitable. When it proceeds from acid humours in the ſtomach, abſorbent and alkaline medicines are good. If it proceeds from an acute fever, or an inflammation of the ſtomach, it is a dangerous diſeaſe: however, dulcified ſpirit of nitre, joined to an alexipharmic, and given often, is proper; or a dram of diaſcordium given in the evening, may perform a cure. If it proceeds from a gangrene or mortification, it is generally incurable; but peruvian bark, with medicines againſt internal inflammations, are moſt likely to ſucceed. If it is cauſed by poiſon, plenty of milk muſt be taken with oil. Fuller declares, that he does not know a better medicine than the julep of muſk; and Allen ſays, that this affords, one would almoſt think, ſupernatural aſſiſtance.

HICKWALL, or WITWALL, in ornithology, names uſed in ſeveral parts of the kingdom for the leſſer black and white woodpecker, with the three lateral long feathers of the tail variegated at the top. It is a ſmall bird, hardly weighing more than an ounce. See the articles PICUS and WOODPECKER.

HIDAGE, in law-books, an extraordinary tax antiently paid to the king for every hide of land. Sometimes, indeed, it is uſed for being quit of this tax.

HIDE, the ſkin of beaſts, but particularly applied to thoſe of large cattle, as bullocks, cows, horſes, &c. See the article SKIN.

Hides are either raw or green, juſt as taken off the carcaſe; ſalted or ſeaſoned with ſalt, alum, and ſalt-petre, to prevent their ſpoiling; or curried and tanned. See the article CURRYING, TANNING, &c.

Hides make a conſiderable article of commerce, being ſubject to the following duties and drawbacks, on importation, and when exported again. Buff-hides pay each 3 s. $9\frac{60}{100}$d. and draw back 3 s. $6\frac{75}{100}$d. and beſides pay for every pound weight 7 d. and draw back $4\frac{66\frac{2}{3}}{100}$d. Cow or horſe-hides in the hair, pay each $7\frac{18\frac{1}{8}}{100}$d. and draw back $6\frac{46\frac{7}{8}}{100}$d. ditto tanned, pay each 2 s. $4\frac{72\frac{1}{2}}{100}$d. draw back 2 s. $1\frac{87\frac{1}{2}}{100}$d. and for every pound weight $3\frac{50}{100}$d. draw back $2\frac{33\frac{1}{3}}{100}$d. Cow-hides of Barbary and Muſcovy pay each $7\frac{18\frac{1}{8}}{100}$d. draw back $6\frac{46\frac{7}{8}}{100}$d. And beſides if dreſſed in oil, for every pound weight 7 d. draw back $4\frac{66\frac{2}{3}}{100}$d. if tanned, the pound weight $3\frac{50}{100}$d. draw back $2\frac{33\frac{1}{3}}{100}$d. if tawed, the hide 3 s. 6 d. draw back

2 s. 4 d. India hides pay each 11$\frac{96\frac{7}{8}}{100}$d. draw back 10$\frac{78\frac{1}{8}}{100}$d. and befides if dreff-ed in oil, for every pound weight 7d. draw back 4$\frac{66\frac{2}{3}}{100}$d. if tanned, for each pound 3$\frac{50}{100}$ d. draw back 2$\frac{33\frac{1}{3}}{100}$ d. if tawed, for each hide 3 s. 6 d. draw back 2 s. 4 d. Hides of horfes, mares and geldings, pay for every 20 s. of their value upon oath 4 s. 9$\frac{45}{100}$ d. draw back 4 s. 3$\frac{75}{100}$ d. and befides for every hide, 2 s. draw back 1 s. 4 d. Lofh-hides pay each 1 s. 10$\frac{80}{100}$ d. draw back 1 s. 9$\frac{37\frac{1}{2}}{100}$ d. and befides for every pound weight, 7 d. draw back 4$\frac{66\frac{2}{3}}{100}$d. Red or Mufcovy hides tanned, coloured, or uncoloured, pay each 1 s. 7$\frac{15}{100}$d. draw back 1 s. 5$\frac{25}{100}$ d. and befides for every pound weight, 3 d. draw back 2 d. All other hides, and pieces of hides, not above particularly charged, pay for every 20 s. value upon oath, 4 s. $\frac{45}{100}$d. draw back 4 s. 3$\frac{75}{100}$d. and if tanned, for every pound weight, 3$\frac{50}{100}$d. draw back 2$\frac{33\frac{1}{3}}{100}$ d. if dreffed in oil, for each pound 7 d. draw back 4$\frac{66\frac{2}{3}}{100}$d. and if tawed, each hide pays 3 s. 6 d. and draws back 2 s. 4 d.

For the duty on britifh hides, tanned, &c. See the articles EXCISE, LEATHER, PARCHMENT, &c.

Hides and calves-fkins, tanned in Great Britain, draw back, upon due exportation, two third parts of the duties originally paid for them; and befides a farther allowance of one penny for every pound weight of fkin fo dreffed, there is a draw-back of 1$\frac{1}{2}$ d. for every pound weight manufactured into boots, fhoes, gloves, &c.

HIDE *of land*, was fuch a quantity of land as might be plowed with one plough within the compafs of a year, or fo much as would maintain a family; fome call it fixty, fome eighty, and fome an hundred acres.

The diftribution of this kingdom by hides of land is very antient, mention being made of it in the laws of king Ina. Henry I. had three fhillings for every hide of land, in order to raife a dowry for his daughter: this tax was called hidage.

HIDE-BOUND, among farriers, a diftemper in horfes when the fkin fticks fo faft to the back and ribs, that the hand cannot feparate the one from the other without great difficulty: his body is at the fame time lean, his back-bones ftand up, his guts are for the moft part deficient in moifture, and his dung dry and more offenfive than common.

If a horfe become hide-bound by hard riding and ill keeping, he may be cured by good keeping. If it be the effect of a fever, or fome other difeafe, if that be cured which is the caufe, the effect will ceafe: but if he has no fever upon him, and he is hide-bound only from lownefs of blood and fpirits, give him boiled barley, white-water, or the like, and when his flefh is raifed, harden it with good oats, beans, and moderate exercife.

HIDEL, in old law-books, denotes a fanctuary or place of protection.

HIDROTICS, in medicine, the fame with fudorifics. See SUDORIFIC.

HIERACIUM, HAWKWEED, in botany, a genus of the fyngenefia-polygamia-æqualis clafs of plants, the compound flower of which is imbricated and uniform, confifting of a great number of equal, hermaphrodite corollulæ, which are linear, truncated, and quinquedentated: the ftamina are five very fhort capillary filaments: the feeds are folitary, obtufely quadragonal, and winged with down. See plate CXXXI. fig. 3.

The leaves of this plant are efteemed cooling, and good in inflammations. They likewife ftrengthen the fight.

HIERACITES, *hieracitæ*, in church-hiftory, chriftian heretics in the third century, fo called from their leader Hierax, a philofopher of Egypt; who taught that Melchifedec was the holy ghoft, denied the refurrection, and condemned marriage; he likewife held, that no one could be faved who died before he arrived at years of difcretion. The difciples of Hierax taught that the word, or fon of God, was contained in the father, as a little veffel is contained in a great one; from whence they had the name metagimonifts, from the greek word μεταγγιμονος, which fignifies contained in a veffel.

HIERA PICRA, in pharmacy, a powder prepared in the following manner: take

of the gum extracted from socotrine aloes, one pound; of winter's bark, so called, three ounces; powder them separately, and then mix them.

Species of HIERA PICRA, according to Quincy, is made thus: take of cinnamon, zedoary, asarum, the lesser cardamom seeds, and saffron, of each six drams; cochineal, a scruple; of the best aloes, twelve ounces; and let them all be made into a powder together.

Simple HIERA PICRA, is made by mixing the spices of hiera picra with despumated honey, or syrup of violets, into an electuary.

Tincture of HIERA PICRA, is made thus: take of the species of hiera picra, one ounce; of white-wine, one pound; digest and then strain off the fine liquor. It may be made in the same manner with a french spirit.

This may be so managed as to become a good alterant. It is generally given over night from two to three ounces; and sometimes only one spoonful at night, and it produces excellent effects in a cachexy, chlorosis, and obstructions of the menses.

HIERARCHY, among divines, denotes the subordination of angels. See the article ANGEL.

Some of the rabbins reckon four, others ten, orders or ranks of angels; and give them different names, according to their different degrees of power and knowledge. Dionysius the areopagite, the jesuit Celert, and many others, have gone so far as to settle a kind of ceremonial or rule for the precedency of angels, as seraphim, cherubim, thrones, dominions, principalities, &c.

HIERARCHY likewise denotes the subordination of the clergy, ecclesiastical polity, or the constitution and government of the christian church, considered as a society.

The nature of this polity will be best understood, by looking back to the constitution of the antient christian church; which, as a society, consisted of several orders of men, *viz.* ἡγεμενοι, πιςοι, and κατηχεμενοι; that is, rulers, believers, and catechumens.

Under the rulers are comprehended the whole body of the clergy, *viz.* bishops, priests, and deacons. See the articles BISHOP, PRIEST, &c.

The believers were perfect christians, and the catechumens imperfect. See the articles CHRISTIANS and CATECHUMEN.

It has been pretended, says Broughton, that the bishops and presbyters were the same, which opinion has given rise to the presbyterians. See PRESBYTERIANS.

The bishops, presbyters, and deacons, therefore, according to him, constituted the three superior orders of the clergy; besides whom there were several inferior orders, as subdeacons, acoluthists, exorcists, readers, door-keepers, singers, catechists, stewards, &c. See the article ACOLUTHI, &c.

All these orders of the clergy, continues the same author, were appointed to their several offices in the church, by solemn forms of consecration or ordination, and had their respective privileges, immunities, and revenues: and by means of this gradation and subordination in the hierarchy, the worship and discipline of the primitive church were kept up.

How far the constitution of our own churches agrees with or has departed from the plan of the antient hierarchy, may be seen at one glance of the eye. We have the first general distinction of bishops, presbyters or priests, and deacons. Among the first, we retain only the distinction of archbishops, with the title likewise of primates and bishops; having no patriarchs or chorepiscopi: but as to the inferior orders of the clergy, as acoluthists, &c. they are all unknown to the church of England.

The unity and order of the christian church were secured by laws both ecclesiastical and civil. The ecclesiastical laws were, either rules and orders made by each bishop for the better regulation of his particular diocese; or laws made in provincial synods, for the government of all the dioceses of a province; or, lastly, laws respecting the whole christian church made in general councils. See SYNOD.

The civil laws of the church, were the edicts made from time to time by the emperors, either restraining the power of the church, granting it new privileges, or confirming the old; and the breach of these laws were severely punished both by the church and state.

HIERES, a town of Provence, in France, situated on the Mediterranean, eight miles east of Toulon: east long. 6° 5′, north lat. 43° 5′.

HIERES is also the name of several islands situated in the Mediterranean, near the coast of France, opposite to the towns of Hieres and Toulon.

HIEROGLYPHICS, in antiquity, mystical characters, or symbols, in use among the

the Egyptians, and that as well in their writings as inscriptions; being the figures of various animals, the parts of human bodies, and mechanical instruments.

But besides the hieroglyphics in common use among the people, the priests had certain mystical characters, in which they wrapped up and concealed their doctrines from the vulgar. It is said, that these something resembled the chinese characters, and that they were the invention of Hermes. Sir John Marsham conjectures, that the use of these hieroglyphical figures of animals, introduced the strange worship paid them by that nation: for as these figures were made choice of, according to the respective qualities of each animal, to express the qualities and dignity of the persons represented by them, who were generally their gods, princes and great men, and being placed in their temples, as the images of their deities; hence they came to pay a superstitious veneration to the animals themselves.

The meaning of a few of these hieroglyphics, has been preserved by antient writers. Thus we are told they represented the supreme deity by a serpent with the head of a hawk. The hawk itself was the hieroglyphic of Osiris; the riverhorse, of Typhon; the dog, of Mercury; the cat, of the moon, or Diana; the beetle, of a couragious warrier; a new-born child, of the rising sun; and the like.

HIEROGRAMMATISTS, ἱερογραμματεῖς, *i. e.* holy registers, were an order of priests among the antient Egyptians, who presided over learning and religion.

They had the care of the hieroglyphics, and were the expositors of religious doctrines and opinions. They were looked upon as a kind of prophets, and it is pretended that one of them predicted to an egyptian king, that an Israelite, (meaning Moses) eminent for his qualifications and atchievements, would lessen and depress the egyptian monarchy. They were thought to be skilled in amulets and charms, in astrology and augury: by this means they had a great sway in the egyptian senate or council, and were always at court to assist the king with their advice. They were exempted from the public taxes, were esteemed of the highest quality, and bore a scepter like the king's: but after the conquest of Egypt by the Romans, they became very inconsiderable, and dwindled into mere fortune-tellers. They wore a linen-coat, and paper-shoes; they bathed thrice a day and twice in the night in cold water, and in their religious worship used to beat and discipline themselves very severely.

HIEROMANCY, ἱερομαντεία, in antiquity, that part of divination which predicted future events from observing the various things offered in sacrifice. See DIVINATION and SACRIFICE.

HIEROMENIA, in antient chronology, a corinthian month, commonly called panemos; being the same with the athenian boedromion.

HIEROMNEMON, the name of an officer in the greek church, whose principal function it was to stand behind the patriarch at the sacraments, and other ceremonies of the church, and to shew him the prayers, psalms, &c. in the order in which they were to be rehearsed. He likewise assisted the patriarch in putting on his pontifical vestments; and assigned their places to those who sat round him, when seated on his throne. This office, in this latter respect, was the same as that of master of the ceremonies to the pope. The hieromnemon was commonly a deacon.

HIEROPHANTES, in grecian antiquity, the name by which the Athenians called those priests and priestesses who were appointed by the state to have the supervisal of things sacred, and to take care of the sacrifices.

They were obliged to the strictest continency, in regard to the dignity of their ministry; for which reason they drank decoctions of hemlock, to extinguish carnal desires.

The ceremonies of initiation, into the mysterious rites of Ceres, was performed by the hierophantes; whose names were held in such veneration, that the initiated were expresly forbidden to mention them in the presence of the profane.

HIEROPHYLAX, an officer in the greek church, who was guardian or keeper of the holy utensils, vestments, &c. answering to our sacrista or vestry-keeper.

HIEROSCOPY, the same with hieromancy. See HIEROMANCY.

HIGH, *altus*, a term of relation, importing one thing's being superior or above another: thus we say, a high mountain, the high-court of parliament, high relievo, &c. See the articles MOUNTAIN, PARLIAMENT, &c.

HIGH, in music, is sometimes used in the same sense with loud, and sometimes in the same sense with acute.

HIGH *bearing cock*, a term used in speaking of fighting cocks, for one that is larger than the cock he fights with.

HIGH-WATER, the state of the tide when highest, or the time just before it begins to ebb. See the article TIDES.

HIGH-WAY, a free passage for the king's subjects, on which account it is called the king's high-way, tho' the freehold of the soil belong to the lord of the manor, or the owner of the land. Those ways that lead from one town to another, and such as are drift or cartways, and are for all travellers in great roads, or that communicate with them, are high-ways only; and as to their reparation, are under the care of surveyors.

By the 2 & 3 Phil. & Mar. c. 8. it is enacted, that constables and church-wardens of parishes, calling the parishioners together, shall yearly elect two honest persons to be surveyors of the high-ways, who are thereby authorized to order and direct the persons and carriages employed in amending them: and the persons so chosen, are to take upon them the execution of the office, on pain of forfeiting 20 s. The same statute has farther ordained, that certain days shall be appointed for working on the repairs of high-ways, on which every person having a plough-land, or keeping a draught or plough, is to send out one cart, provided with horses, tools, &c. and two able men attending; also clergymen, keeping a coach and horses, shall be obliged to send out a team, or shall forfeit 10 s. for every default therein: and every householder or cottager shall work on the said days, for the amendment of the high-ways, under the penalty of 1 s. 6 d. a day, leviable by distress, &c. Where a high-way lies within a parish, the parish is bound to repair it, unless it appears that the same ought to be repaired by some person, either by reason of tenure or prescription. On oath made, by the surveyors, of sums expended in repairing any high-way, justices of the peace may order them a rate not exceeding 6 d. in the pound; but money thus raised, shall not excuse working on the high-ways, where the statute-work and labour has not been performed. 3 & 4. Wil. & Mar. If a high-way leading through a field is out of repair, travellers may justify going out of the track, tho' there be corn sown; and in case a high-way is not sufficient, any passenger may break down the inclosure, and go over the land adjoining, till a sufficient way be made. All manner of injuries to high ways that render them less commodious to travellers, are deemed nusances; such as laying logs of timber in them, erecting gates, or making hedges across them, permitting boughs of trees to hang over them, &c. Persons neglecting to scour their ditches, whereby the ways are dangerous, after thirty days notice given by the surveyors, are liable to the forfeiture of 2 s. 6 d. for every eight yards not scoured; and not under 20 s. or exceeding 5 l. if they permit soil to lie in the high ways. Geo. I. c. 52. Posts with inscriptions ought to be set up by surveyors, where two or more cross roads meet, as a direction to travellers to the next market-towns, on the penalty of 10 s. 8 & 9 Wil. III. 7 Geo. II. c. 9.

HIGH-WAY-MEN, are robbers on the high-way, for the apprehending and taking of whom a reward of 40 l. is given by the statute of 4 & 5 Wil. & Mar.

HIGHAM-FERRERS, a borough town of Northamptonshire, twelve miles north-east of Northampton: it sends two members to parliament.

HIGHNESS, a title given to princes. Before king James I. the kings of England had no other title but that of highness; which was also the case of the kings of Spain before Charles V.

At present all the sons of crowned heads are stiled royal highness, as the electors of Germany are electoral highness.

HIGHWORTH, or HIGWORTH, a market town of Wiltshire, situated thirty miles north of Salisbury.

HIIS TESTIBUS, a phrase antiently added in the end of a deed, written in the same hand with the deed; upon which the witnesses were called, the deed read, and their names entered. See the article WITNESS.

Hiis testibus in subject deeds, continued till, and in, the reign of Henry VIII.

HILARIA, an antient roman festival, observed on the eighth of the calends of April, or the twenty-fifth day of March, in honour of the goddess Cybele. It was so called from the various expressions of joy and mirth on this occasion. The statue of the goddess was carried in procession through the streets of the city. The day was spent in masquerades of all sorts, and every one was permitted to appear

appear in what difguife he pleafed. The day before the feftival was fpent in tears and mourning; the reafon of which was probably this: Cybele reprefented the earth which, at that time of the year, begins to feel the kindly warmth of the fpring, and to pafs from winter to fummer; fo that this fudden tranfmutation from forrow to joy, was an emblem of the viciffitude of the feafons, which fucceded one another.

HILARODI, in the antient mufic and poetry, a fort of poets among the Greeks, who went about finging little gay poems or fongs, fomewhat graver than the ionic pieces, accompanied with fome inftrument. From the ftreets they were at length introduced into the tragedy, as the magodi were into comedy. They appeared dreffed in white, and were crowned with gold. At firft they wore fhoes, but afterwards they affumed the crepida; being only a foal tied over with a ftrap.

HILARODIA, a poem or compofition in verfe, made or fung by a fort of rapfodifts called hilarodi. See the preceding article.

HILARO-TRAGEDIA, a dramatic performance, partly tragic, and partly comic. Scaliger holds the hilaro-tragedia, and the hilarodia, or poem fung by the hilarodi, to be the fame thing. Others rather take the hilaro-tragedia to have been pretty nearly what we call a tragicomedy. Others again will have it to have been a pure tragedy, only terminating with a happy cataftrophe, which brings the hero out of the wretched into the fortunate ftate. Suidas mentions one Rhinthon, a comic poet of Tarentum, as the inventor of this kind of poetry.

HILARY-TERM, among lawyers. See the article TERM.

HILDESHEIM, the capital of a bifhopric, furrounded by the territories of Brunfwic, and fubject to its own bifhop: eaft long. 10°, north lat. 52° 17′.

HILL, in the natural hiftory of the earth. See the article MOUNTAIN.

HILUM, among botanifts, denotes the eye of a bean. See BEAN and EYE.

HIN, a hebrew meafure of capacity for things liquid, containing the fixth part of an epha, or one gallon two pints, or 2.533 folid inches, englifh meafure.

HIND, a female ftag in the third year of its age.

HIND-CALF, a male-hart or hind in the firft year. She fawns in April or May. See the article HUNTING.

HIND, or HINE. See the article HINE.

HIND HAND, in the manege. See the article HAND.

HINDENI HOMINES, fignifies a fociety or clafs of men.

In the time of our Saxon anceftors, all men were ranked into three claffes, and rated agreeably to the claffes they were in; and if any one committed an injury, he was to make reparation according to the value of the perfon to whom it was done. The loweft were thofe worth 200 fhillings, who were called *viri ducenteni*, or *twyhindemen*, and their wives *twyhindas*. The middle were valued at 600 fhillings, and were termed *fixhindemen*, and their wives *fixhindas*: and the higheft were valued at 1200 fhillings, and were ftiled *twelfhindemen*, and their wives *twelfhindas*.

HINDON, a borough town of Wiltfhire, fituated fourteen miles weft of Salifbury: it fends two members to parliament.

HINDOWN, or HENDOWN, the capital of the country of the Hindowns, in the hither India: eaft long. 76° 30′, north lat. 27°.

HINE, or HIND, a hufbandman's fervant. Thus the perfon who overfees the reft, is called the mafter hine.

HINGES, the joints on which gates, doors, lids, folds of tables, &c. hang and turn in opening, fhutting, or folding.

They are of different denominations, as butts, ufed by the joiners for hanging table-leaves, &c. (See plate CXXXII. fig. 1. n° 1.) Cafement, for hanging cafements upon (*ibid.* n° 2.) dove-tails, (n° 3.) and effes (n° 4.) for light doors and lockers; garnet crofs, for hanging large doors or heavy fcuttles in fhips (n° 5.); port, for hanging fhips ports (n° 6.); fcuttle, particularly ufed for fcuttles (n° 7.)

Befides thefe there are many others of different forms and ufes, diftinguifhed by different names, as cafting, cheft-black Lancafhire, fmooth-field coach, defk, dozen ware long, dozen ware fhort, weighty long, weighty fhort, lambs-heads, port fide Lancafhire, fide fmooth-field, fide with fquares, fide with rifing joints, Lancafhire and fmooth-field ftalls; beds, box, trunk of feveral kinds; fcrew, fhutter, Lancafhire joints, and Lancafhire dozen-ware with hooks.

Hinges of all kinds are prohibited to be imported.

HINGHAM, a market-town, ten miles fouth-weft of Norwich.

HINK-

HINKLEY, a market-town, ten miles south of Leicester.

HIP, or HAW, in the materia medica, is reputed attenuant and diuretic. There is a very pleasant conserve of hips kept in the shops.

HIP, or HAUNCH, among farriers. See the article HAUNCH.

HIP-SHOT, is said of a horse that has sprained his haunches. See STRAIN.

HIPS in building, those pieces of timber placed at the corner of a roof.

The hips are much longer than the rafters, by reason of their oblique position, and are planted not with a right or square angle, but a very oblique one, and consequently are not, or at least ought not, to be square at any angle, (as rafters are not at all) but level at every one of them; and, which is more, as rafters have but four planes, these commonly have five. They are generally by country workmen called corners; and some call them principal rafters, and others sleepers. The truth is, hips and sleepers are much the same, only sleepers lie in the vallies, (and join at the top with the hips) but those surfaces or planes which make the back of the hip, are under the sides of the sleeper.

The backs of a hip are those two superficies or planes on the outside of the hip, which lie parallel, both in respect of the length and breadth, with the superficies of the adjoining side and end of the roof.

HIP-GOUT, *sciatica*. See the articles GOUT and SCIATICA.

HIP-MOULD, is by some used for the back of the hip, but others understand it to mean the prototype or pattern, commonly made of a thin piece of wainscot, by which the back and sides of the hip are set out.

HIP-ROOF, among carpenters, called also italian roof, is a roof which has neither gable-head, shread-head, nor jerken-head (by which is meant such heads as are both gable and hip at the same end:) for it is a gable or upright as high as the collar-beam, and then there are two short hips, which shut up with their tops to the tops of a pair of rafters, which country carpenters call singlars. A hip roof has rafters as long, and with the angles of the foot, &c. at the ends of buildings, as it has at the sides; and the feet of the rafters at the ends of such buildings as have hip-roofs, stand on the same plane, *viz.* parallel with the horizon, and at the same height from the foundation, with rafters on the sides of the roof.

HIPPARCHUS'S PERIOD. See PERIOD.

HIPPEUS, in physiology, a kind of comet, so called from its resemblance to a horse. But the shape of this comet is not always alike, being sometimes oval, and sometimes imitating a rhomboidos. Its train also is sometimes spread from the front, or fore part, and sometimes from the hind part.

Hence this class of comets is distinguished into equinus barbatus, equinus quadrangularis, and equinus ellipticus. See the article COMET.

HIPPO, in zoology, a species of serpent, with 160 scuta on the abdomen, and 100 squamæ on the tail. See COLUBER and SERPENT.

HIPPOBOSCA and HIPPOBOSCUS, in zoology, names given to the horse-fly, frequent about the bodies of horses, to whom it is very troublesome.

HIPPOCAMPUS, the SEA HORSE, in ichthyology, the square-bodied syngnathus, with no fin at the tail. It is five inches long, and where thickest, about an inch in diameter; the head is long, slender, and compressed, forming a kind of snout; the body is of a quadrangular figure, but the divisions are not equal, and in the thickest part it is hexangular or heptangular. See SYNGNATHUS. It is a very singular and rare fish; the tail of which usually curls up in the drying, and its head being bent down, gives it a rude resemblance to a horse; whence the name. See plate CXXXII. fig. 3.

HIPPOCASTANUM, HORSE-CHESNUT, the same with the esula of Linnæus. See the article ESULA.

HIPPOCENTAUR, in antiquity, a fabulous animal, half man half horse.

What gave rise to the fable of hippocentaurs, was this. The Thessalians are said to have been the first inventors of the art of breaking horses; and being first seen on horseback, they seemed to make but one body with the horses; whence the origin of the fable.

HIPPOCRAS, an infusion of aromatic powders in wine, which is afterwards edulcorated with sugar and honey; being so called because that, when the infusion is finished, it is strained through Hippocrates's sleeve.

It is prepared of various aromatics and other

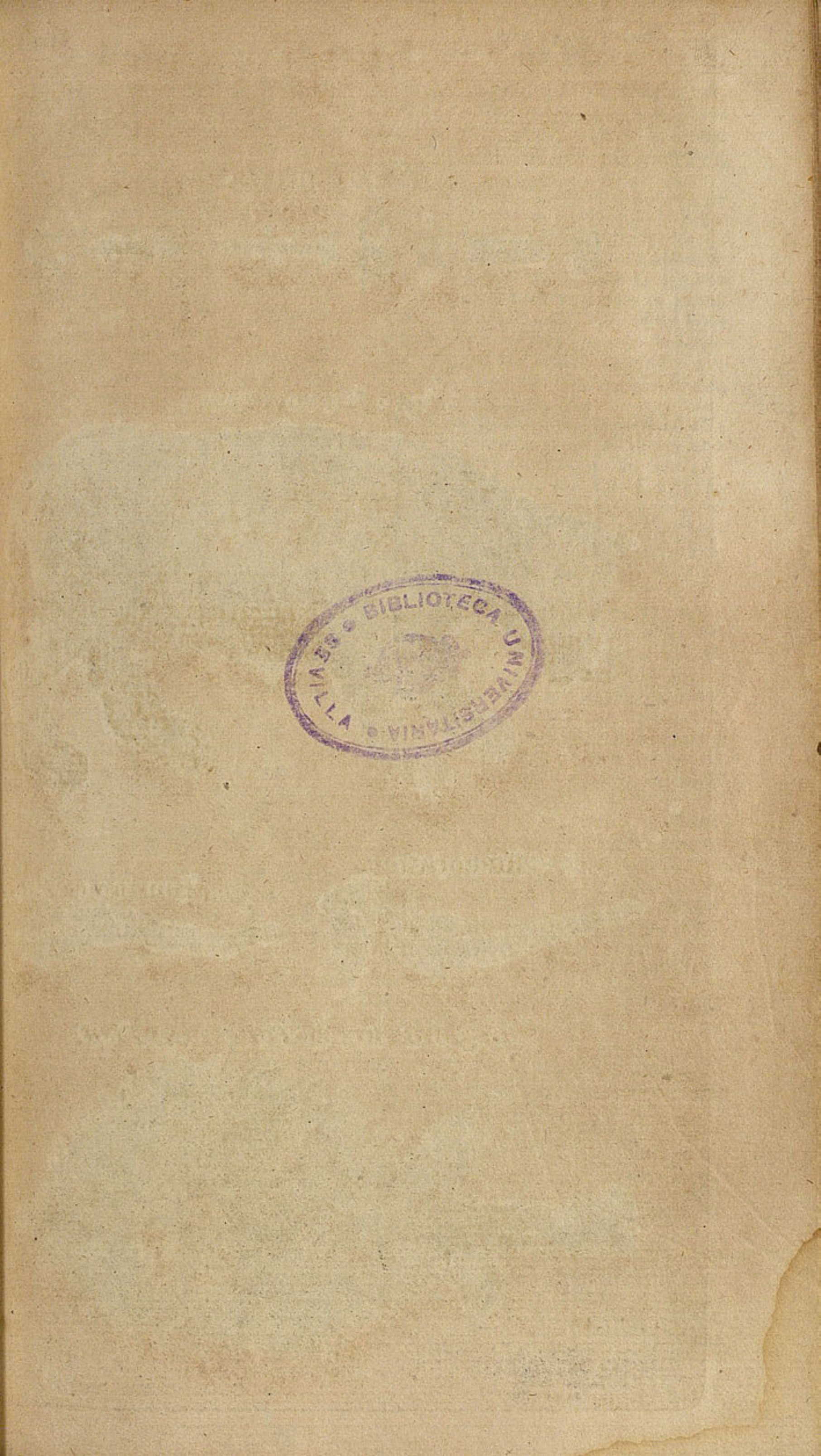

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Fig: 1. Hinges.

1 2 3 4 5 6 7

Fig: 2. Hippopotamus.

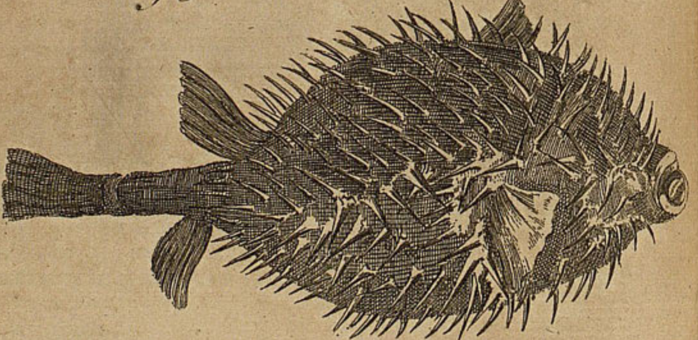


Fig: 3. Hippocampus.



Fig: 4. Hirudo, the *Leech*.

Fig: 5. Histrix, the *Porcupine-Fish*.



T. Jefferys sculp

other ingredients, according to the different intentions to be anſwered.

HIPPOCRATEA, in botany, a genus of plants, whoſe characters are not juſtly aſcertained: the calyx is a perianthium formed of a ſingle leaf, patent, and lightly divided into five obtuſe ſegments, larger than the corolla; the corolla is monopetalous, oval, truncated at the top, and undivided at the edges: the fruit is a capſule of a depreſſo-plane figure, patent, ſemitrifid, with trifid ſegments; and contains three cells, each of them bivalve, and the valves carinato-compreſſed: the ſeeds are oblong, and have a membranaceous ala.

HIPPOCRATES's SLEEVE, a bag uſed to ſtrain ſyrups and decoctions for clarification. See CLARIFICATION.

HIPPOCREPIS, COMMON HORSESHOE VETCH, in botany, a genus of the diadelphia-decandria claſs of plants: the corolla is papilionaceous; the vexillum cordated, ſeated in the ungues the length of the cup; the carina is lunulated and compreſſed: the fruit is a compreſſed plane pod, very long and reflex, and jointed: the ſeed is ſingle in each joint, of an oblong and incurved figure.

HIPPODROME, in antiquity, the courſe where horſe-races were performed.

HIPPODROMUS, in grecian antiquity, the bœotian name for the athenian month hecatombæon. See HECATOMBÆON.

HIPPOGLOSSUS, the TURBOT, in ichthyology, a ſpecies of pleuronectes, with the eyes on the right ſide, and the body ſmooth.

It grows to a conſiderable ſize, and is one of the moſt eſteemed fiſh at our tables. The dorſal-fin reaches from the head to the tail, and has an hundred and five rays; the pectoral fins have each ſixteen rays, and the ventral ones ſix. See the article PLEURONECTES.

HIPPOMANE, in botany, a genus of plants whoſe characters are not properly aſcertained; the male and female flowers are produced diſtinct; the male flower has no corolla: the fruit is a large, globoſe berry, ſomewhat umbilicated, and containing only one cell: the ſeed is round and woody. The eating of this plant is ſaid to make horſes mad, whence its name ἱππομανής.

HIPPOMANES ſignifies the expreſſed juice of the tithymallus: as alſo a juice diſtilling from the genitals of a mare, in the time of her covering: ſome again take it for the ſecundines of a mare; and, laſtly, it ſignifies a fleſhy ſubſtance adhering to the forehead of a colt newly foaled, which ſome imagine to have a virtue of procuring love, and promoting the birth.

HIPPOMYRMEX, the HORSE-ANT, in zoology, a ſpecies of ant, much larger than the common ant. See ANT.

HIPPOPHAE, the SWALLOW-THORN, or SEA BUCK-THORN, in botany, a genus of the dioecia-tetrandria claſs of plants, having no corolla; the calyx of the male flowers is divided into two parts, as is alſo the calyx of the female: the fruit is a globoſe, unilocular berry; the ſeed is ſingle and roundiſh.

Hippocrates preſcribes the juice of this plant to evacuate white phlegm; and alſo as a cathartic in other diſorders.

HIPPOPOTAMUS, the RIVER-HORSE, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the fore teeth of the upper jaw are four, and placed in pairs; thoſe of the lower jaw are prominent, and the intermediate ones are protended forward: the canine-teeth are ſingle, and obliquely truncated; the teats are only two, and placed near the groin.

The hippopotamus is a native of Africa, paſſing a great part of its time under water, in the rivers of the Nile and Niger; but comes on ſhore to ſleep and breed. It is a large unweildy animal, as big as an ox. See plate CXXXII. fig. 2.

HIPPURIS, in botany, a genus of the monandria monogynia claſs of plants, having no corolla: the cup is ſcarce diſtinguiſhable; it conſiſts of only two extremely ſmall margins, ſtanding oppoſite to one another on the head of the germen: there is no pericarpium; but after every flower there comes a ſeed, which is roundiſh and naked.

HIPPURUS, in ichthyology, the dolphin or coryphæna with a forked tail. See the articles DOLPHIN and CORYPHÆNA.

HIRCANIA, in geography, the provinces of Perſia in Aſia, which lie on the ſouthern ſhore of the Caſpian ſea.

HIRCHFIELD, a city of Germany, in the circle of the upper Rhine, and langraviate of Heſſe Caſſel, ſituated on the river Fuld, in eaſt long. 9° 32′, north lat. 50° 47′.

HIRCI, or SANGUIS HIRCI. See the article SANGUIS.

HIRCUS, in anatomy, a part of the auricle or outer ear, being that eminence next the temple. See EAR.

HIRCUS, a GOAT, in aſtronomy, a ſtar of the



the firſt magnitude, the ſame with capella. See the article CAPELLA.

HIRCUS is alſo a name uſed by ſome writers for a comet encompaſſed, as it were, with a mane, ſeemingly rough and hairy.

HIRCUS, a denomination given to the rank ſmell exhaling from the armpits.

HIRSBURG, a town of Sileſia, in the territory of Jawer, forty-four miles ſouth-weſt of Breſlaw, in eaſt long. 15° 50′, north lat. 50° 50′.

HIRTELLA, in botany, a genus of the triandria-monogynia claſs of plants, the corolla whereof conſiſts of five equal petals: theſe are roundiſh and hollow, ſmaller than the cup, and deciduous: the fruit is an oval berry, broadeſt at the top, a little compreſſed, and obſcurely trigonal: the ſeed is ſingle, and of the figure of the cup.

HIRUDO, the LEECH, in zoology, a well known naked inſect, with a flatted but not jointed body, and broader at the end than elſewhere, and the ſkin ſoft and gloſſy.

The common leech grows to two or three inches in length, and is of a blackiſh colour, variegated with yellow. See plate CXXXII. fig. 4.

The horſe-leech is larger than the former ſpecies, black on the back, and lead-coloured on the belly. The ſnail-leech, is only about an inch in length, and of a whitiſh colour; and the great-tailed leech grows to an inch and an half in length, and is of a duſky-brown colour. See the article LEECH.

HIRUNDO, in ornithology, a genus of birds, of the order of the paſſeres; comprehending the common houſe-ſwallow, the field ſwallow, the martin, and the goat-ſucker.

The characters of the genus are theſe: the beak is very ſmall, of a ſubulated figure, crooked, and depreſſed at the baſe; and the opening of the mouth is enormouſly wide.

The common ſwallow is about the ſize of the linnet: the upper part of the body is of a gloſſy bluiſh-black, the tail-feathers are ſpotted with white, and the breaſt and belly are of a ſnow-white.

HIRUNDO, the SWALLOW FISH or TUB-FISH, in ichthyology, a ſpecies of trigla, with a ſomewhat prickly head, and with a remarkable pinnule at the pectoral fins: which are ſo long, as to be of uſe in flying, or raiſing itſelf above the water. Hence, by ſome inaccurate writers, it has been confounded with the exocoetus, or flying-fiſh, properly ſo called. See the article EXOCOETUS.

HISPANIOLA, an iſland of America, in the Atlantic ocean, ſituated between 67° and 74° of weſt long. and between 18° and 20° north lat. being about 420 miles long from eaſt to weſt, and 120 in breadth. It is frequently called St. Domingo, from the capital thereof.

HISPID LEAF, among botaniſts, one whoſe ſurface is covered with more thick and rigid hairs than the piloſe leaves are.

HISPID STALK, among botaniſts, a ſtalk roughly hairy.

HISSING LETTERS, among grammarians, are S, X, and Z, ſo called on account of their harſh ſound.

HISTORICAL, ſomething that relates to hiſtory: thus we ſay, hiſtorical truth, hiſtorical ſtyle, hiſtorical narration of facts, &c. See the article HISTORY.

HISTORIOGRAPHER, a profeſſed hiſtorian, or writer of hiſtory.

An hiſtorian of all authors ſpreads the moſt ample theatre; he erects the greateſt tribunal on earth; for it is his office to ſit ſupreme judge of all that paſſes in the world, to pronounce the deſtiny of the great ones of the earth, and fix their character with poſterity; to do juſtice to virtue and worth, in beſtowing eternity upon great and good actions, and fixing an everlaſting mark of infamy on bad ones; to inſtruct all people and nations, and direct the conduct of ages; he therefore ought to be endowed with many great and uncommon qualifications. He muſt be a perſon of conſummate knowledge of men and things, of ſound judgment, uncommon ſagacity and penetration, experienced in matters of ſtate and war, of great integrity, firmneſs of mind, freedom of ſentiment, and maſter of a pure, clear, nervous, and exalted ſtyle. An hiſtorian whoſe province it is to ſpeak to kings and princes, to the great men of all ages and countries, and to be the common maſter and inſtructor of mankind, muſt not only write with purity, ſimplicity, and manly ſenſe, but with dignity and elegance: he muſt reject all that is vulgar and low in ſtyle, make the majeſty and ſublimity of his expreſſion comport with the dignity of his ſubject; muſt by an exact choice and propriety of words, a natural diſpoſition of phraſes, and a prudent moderate uſe of figures, give weight to his thoughts, force to his language, and imprint a character of greatneſs on all that he ſays. He muſt

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at the ſame time repreſent things with an air of gravity and prudence, and not give a looſe to the heat of imagination, or vivacity of wit; but diſcreetly ſuppreſs every thing that ſhall ſeem idle, languid, and unprofitable, and give every thing that juſt figure and proportion which is conſiſtent with propriety and decorum. He muſt endeavour at a noble ſimplicity of thought, language, deſign, and ordinance, and carefully avoid all profuſeneſs of falſe conceit, ſtrained expreſſion, and affected pompouſneſs ſo inconſiſtent with the gravity, dignity, and noble character of hiſtory. In a word, he muſt write ſo as to be intelligible to the ignorant, and yet charm the wiſe; form and expreſs ſuch ideas as are great, and yet ſhall appear very common, and intermix no other ornament with his narration than what the modeſty of truth can bear. He ſhould be above the reach and power of hopes and fears, and all kinds of intereſt, that he may always dare to ſpeak the truth, and write of all without prejudice; religiouſly obſerving never to abuſe the public faith, nor to advance any thing upon common fame, which is always uncertain, but upon undoubted memoirs and faithful relations of ſuch perſons as have had a hand in affairs. He muſt always be upon his guard againſt the biaſs and affections of thoſe who ſupply him with matter, and muſt not credulouſly give his aſſent to the hiſtorians that went before him, without enquiring narrowly into their character, and what influence they may have been under when they wrote, in order to make a juſt eſtimate of their weight and credit.

An hiſtorian, as to his matter, ſhould chooſe ſubjects great in themſelves, and ſuch as are worthy of public fame and remembrance; and ſhould make himſelf ſo far maſter of his matter, as to be able to caſt it into what form he pleaſes, and to ſtrike upon all his ſubjects the colours they are naturally diſpoſed to bear, in order to make his leſſons profitable to poſterity, by regulating the heart and ſpirits of men, animating them to great and virtuous actions by illuſtrious examples, and cautioning them againſt vice, folly, cruelty, and unjuſtice, by laying open the fatal conſequences reſulting from them. The courſe of his narration muſt proceed in the order of time in which the facts happened, in a pure, grave, uninterrupted ſeries, ſuch as may not improperly be compared to a great river flowing with compoſed majeſty and ſtately ſmoothneſs; and when it falls in his way to introduce little occurrences, they muſt be ſo artfully interwoven with the great, in the thread of the narration, as to offer a ſeaſonable entertainment and relief to the reader from the fatigue that too ſedulous an attention to the great, requireth. He muſt alſo obſerve great judgment in the ordinance and diſpoſition of events and their circumſtances, ſo as to intereſt the reader, and let him into all his thoughts and views, by making his perſons act as their character and temper inclined them; diſcovering their manners, ſentiments, deſigns, motives, and operations as they really ſtand in a neceſſary dependence upon each other, and with ſo natural a connection, as to ſhow nothing out of its place. His tranſitions, in which conſiſts the great art of narration, and one of its principal beauties, muſt be natural and eaſy, ariſing from the difference of ſubject rather than expreſſion. He muſt make a wiſe and judicious choice of circumſtances, ſuch as are proper to enlarge and improve the ideas of things, and to ſtrike that light and colour upon them which moſt eaſily attracts belief and engages the mind; and muſt for that purpoſe always obſerve a due mixture of great and little circumſtances, neither of which muſt be carried beyond nature, or be ſo minute, low, or frivolous, as to debaſe his ſubject. He muſt not only recite the bare events and actions of men, but alſo lay open the motives and principles from which they took their riſe, and upon which they proceeded to their final iſſues. He muſt lay open the hearts of the actors, let his reader into the moſt important ſecrets of their councils and deſigns, and oblige him with a ſight of thoſe ſecret ſprings which moved them to enterprizes, and of the cauſes of their ſucceſs or miſcarriage. He muſt be very ſparing and cautious in the uſe of deſcriptions, which are to be introduced ſo far only as they ſerve to illuſtrate things that are eſſential to the main ſubject, and to enliven the narration: and even in that caſe, they muſt be ſuccinct and elegant. The frequent uſe of harangues are diſapproved of by many judicious perſons; for theſe long formal harangues of generals to their ſoldiers, when in the preſence of the enemy, and ready to enter upon action, which we find in many hiſtorians, are undoubtedly not only unnatural and impro-

improbable, but contrary to the truth of hiftory. Neverthelefs, a fhort fpeech fuited to the fubject, made by a perfon of eminent character has its proper beauty and animates a narration. A judicious hiftorian ought not to admit any portraits into his work but thofe of the greateft perfons, and fuch as are principally interefted, and have the chief hand in affairs; and thefe muft be real, natural and truly refembling their originals; expreffive of their genius, the qualities of the head and heart, rather than defcriptive of the external form of his perfonages. When fuch are finifhed with a mafterly hand, with true judgment and fuccefs, they are not only great ornaments and embellifhments in hiftory, but of ufe to ftrip the hearts of men of their difguifes, to lay open all their fecret folds, and difclofe the real fprings of actions. It is a great fault in an hiftoriographer to abound too much in reflections of his own; he therefore muft not turn philofopher or moralift indifferently upon all occafions; for every man defires to be free in his judgment of the facts reprefented to him, and the confequences he is to draw from them, in which confifts the greateft pleafure of the reader. But if an author fhould throw in, or mingle reflections of his own with his ftory, they muft be fuch as arife naturally from the fubject, and contain a great and noble fenfe in a few words; they muft not be too fine fpun or ftudied, nor have more brightnefs than folidity, but appear rather to be the reafoning of a wife ftatefman, than the affectation of a declaimer; nor muft they be too frequent, or too loofe and difjointed, but be enamelled in the body of the work. Digreffions, if made with judgment, and not too wide and foreign from the fubject, have alfo their proper grace and ornament in hiftory; as they give an agreeable variety to the narration, and relieve the mind of the reader; but they muft be introduced by the hiftorian with an artful hand and great addrefs; they muft bear an alliance and connection with the purport of the hiftory, and their length muft be proportionably greater or lefs, as they are more nearly or remotely allied to the capital point of the ftory.

HISTORY, a defcription or recital of things as they are, or have been, in a continued, orderly narration of the principal facts and circumftances thereof.

Hiftory, with regard to its fubject, is divided into the hiftory of nature, and the hiftory of actions. The hiftory of nature (which is much the fame with phyfiology) is a defcription of natural bodies, whether terreftrial, as animals, vegetables, foffils, fire, water, air, meteors, &c. or celeftial, as the ftars, planets, comets, &c. Hiftory of actions is a continued relation of a feries of memorable events.

Hiftory with regard to its matter, is either natural, facred, civil, ecclefiaftic, literary, or perfonal. Natural hiftory, is a defcription of the fingularities of nature; its irregularities and prodigies; and the alterations it undergoes in the birth, progrefs, end, and ufe of things. Sacred hiftory, is that which lays before us the myfteries and ceremonies of religion, vifions or appearances of the deity, miracles and other fupernatural things, whereof God alone is the author. Civil hiftory, is that of people, monarchies, ftates, communities, cities, &c. Ecclefiaftic hiftory, is that which gives an account of the rife and eftablifhment of the feveral religions and churches, of the rife and progrefs of the various opinions fects and herefies, &c. Literary hiftory treats of arts and fciences, their original progrefs, and of the perfons who have been moft remarkable in difcovering and promoting them. Perfonal hiftory, is that which gives the life of one or more fingle perfons, and is the fame with what is called biography.

Hiftory with regard to its form, is either fimple, figurate, or mixed. Simple hiftory, is that which is delivered without art or ornament; being only a bare, and faithful recital of things, in the manner and order wherein they paffed. Figurate hiftory, is that which is further enriched with ornaments, by the wit and ingenuity of the hiftorian; by laying open the characters of the principal perfons, the fecret fprings and motives of the feveral events, &c. Mixed hiftory, is that which befides the recital and ornaments of figurate hiftory, calls in the proofs and authorities upon which the facts are founded; furnifhing authentic memoirs, or original letters, manifeftos, &c. to vouch the truth of what is advanced. See HISTORIOGRAPHER.

Credibility, foundation, and nature of HISTORY. Some choofe to define hiftory, a true and well grounded account of

of paſt events; a definition equally applicable to all the kinds of it: for tho' in ſome of them, as the hiſtory of nature and literature, we meet with accounts of qualities and opinions; of works of nature and art; yet theſe have no other relation to hiſtory than as they are events, and are deduced from obſervations on paſt changes. And as to the grounds on which the credibility of an hiſtory is founded, they are derived partly from the events related, and partly from the evidence and character of ſuch as relate them; whence ariſes an internal and external credibility.

The interior credibility conſiſts not only in the poſſibility of the event reported, but likewiſe in its probability; which laſt conſiſts in this, that the circumſtances in which an event is reported to have happened be conformable or ſuitable thereto, or that there be ſome foundation for it in the connection of the circumſtances, and that in parallel caſes the ſame had frequently happened. Hence it is eaſy to conceive, that many events may appear improbable, nay incredible to ſome, through mere ignorance, or by ſeparating them from their circumſtances. This is the caſe with the frequent charges of incredibility brought againſt thoſe numerous armies we read of in antient hiſtory, from confounding the regular armies of the moderns, with the tumultuous ones of the antients; which were a kind of militia compoſed of all or the greater part of the fighting men of a country.

Under the external grounds of credibility are comprehended the genuineneſs of the original teſtimony, and the capacity and integrity of thoſe who relate it: the evidence alledged muſt not only be aſcribed to its true authors, but theſe muſt appear to be perſons ſo circumſtanced and inclined as to relate the truth, ſo as to add to it nothing falſe, nor omit any thing of conſequence to the event reported. The firſt of theſe, or the genuineneſs of the original teſtimony, affects not only books and tracts, but public records and monuments of paſt events, ſtatues, inſcriptions, columns, edifices, &c. And to detect the fraudulent practices of former times, in forging evidences of this kind, requires great knowledge in the hiſtory not only of human ſocieties, but of the opinions, ſciences, languages, and cuſtoms of different times. And hence appears the neceſſity of great penetration, and capacity in an hiſtorian; but above all, of great integrity and ſincerity in relating the truth.

In trying the credibility of an event by the number of evidences brought in ſupport of it, we ought to weigh: 1. How many hiſtorians, and other known ſources, are really extant of any particular event. 2. The actual diverſity of their teſtimonies. 3. Their agreement and contradiction; and whether they cannot be reconciled. 4. The exterior and interior credibility of the contradicting narrations.

From what has been ſaid, we may draw the following inferences. 1. That there is a real and demonſtrable certainty of events, which ought not to be doubted or conteſted: and, indeed, ſcepticiſm in hiſtorical matters moſt commonly, if not always, proceeds from ignorance of the real nature of that certainty and its criterion, or from a conſciouſneſs of the indiſpenſible neceſſity of unwearied diligence, of farther helps, and deeper reflection in examining and proving, than the conveniency of many will allow. 2. That the demonſtrability of a fact, the credibility of an hiſtorian who reports, and the evidences of his whole work, ought never to be confounded or miſtaken for one and the ſame thing: for an hiſtorian may be well worth credit, tho' he be not infallible, and even though he has actually committed errors in ſome of his reports. 3. The demonſtrability of events has different degrees and limits, as reaching only ſo far as the records preſerved will permit: and hence appears the neceſſity of well diſtinguiſhing ſuch events, the reality or falſity of which can be proved, from events that are at beſt uncertain and doubtful. 4. That the credibility of events may gain new ſtrength is evident; ſince many facts cannot be known, till after the death of ſuch as were either the actors or perſons concerned in them: beſides it frequently happens, that records and vouchers of tranſactions, long ſince paſt, are afterwards diſcovered, which till then were either unknown, or could not be confidently publiſhed by thoſe who knew them, for want of ſuch witneſſes and proofs. 5. The credit of hiſtory can never decay by age, as ſome have erroneouſly aſſerted; ſince facts, once eſtabliſhed upon good evidence, muſt ever remain ſo, while the vouchers of ſuch evidence are preſerved;

ferved: nay an account which formerly was uncertain, or even confidered as improbable or falfe, may be vindicated and proved by late difcoveries of hiftorical writings and records.

Ufefulnefs of HISTORY. That great advantage may be reaped from the ftudy of hiftory, will appear from the following confiderations. 1. It proves an agreeable amufement, and relaxation: for though the mind is not wholly unactive in the ftudy of hiftory; yet, being a lighter and more entertaining employment, the faculties of the mind, when fatigued and almoft exhaufted with more intenfe employment, find actual repofe, and are recruited and reftored to vigour. 2. But befide the pleafure of ftudying hiftory, it lays a foundation not only for general prudence, but for that particular kind, which the circumftances and fituation of each man require. To become acquainted with the characters of men, the marks, fources, and effects of their paffions and prejudices, the power and changes of their cuftoms, and the like, is an effential and neceffary ftep to prudence: and all this knowlege is confiderably improved by hiftory, which teaches us to make other men's experience our own, to profit by it, and to learn wifdom from their misfortunes. 3. Hiftory is of eminent ufe in promoting virtue, partly by a copious and pleafant inftruction in a right and virtuous conduct in general, and partly by examples that infenfibly lead us to the practice of feveral virtues in particular. 4. Every other fcience receives great benefit from hiftory. Philofophy, and practical mathematics have recourfe to hiftory, or to nature, through the medium of hiftory, for moft of their objects; and in many parts of thefe fciences, the whole force of the demonftration is founded on experiments; which would make but an indifferent figure, if the affiftance of other men's experiments by the means of hiftory were excluded: and the fame holds of divinity, law, medicine, &c.

Method of ftudying HISTORY. Perfons who read hiftory merely for amufement, or, having in view fome particular branch of learning, attend only to certain branches of hiftory, are not confined to that order and connection, which is abfolutely requifite for obtaining a proper knowledge of hiftory; the moft regular, as well as fuccefsful way of ftudying which, is, to begin with an epitome of univerfal hiftory, and afterwards apply to the hiftory of particular nations and commonwealths: for the ftudy of particular hiftories prefuppofes, or, to fpeak more properly, is only extending the knowledge of particular parts of univerfal hiftory. Unlefs this be our plan, we fhall only fill the memory with fome events; which may be done without applying to hiftory, or pretending to the knowledge of it.

HISTORY, in painting, denotes a picture compofed of divers figures, or perfons, reprefenting fome tranfaction, either real or feigned. See PAINTING.

HISTRIO, in the antient drama, fignified an actor or comedian, but more efpecially a pantomime, who exhibited his part by geftures and dancing. See the article DRAMA.

HISTRIX, the PORCUPINE, in zoology. See the article PORCUPINE.

HISTRIX, the PORCUPINE-FISH, in ichthyology, the rough fpotted oftracion, or globe-fifh, befet with frequent fmall fpines.

It grows to about twelve inches in length, and to eight or nine in diameter. It is brought to us dried from the eaftern feas, and has been fometimes caught in the Mediterranean. See plate CXXXII. fig. 5.

HITCH, in the fea language, is to catch hold of any thing with a hook or rope, and by this means to hold it faft: thus when a boat is to be hoifted in, the failors fay, hitch the tackles into the ringbolts of the boat; and when they are about to weigh anchor, hitch the fifhhook to the fluke of the anchor.

HITCHEL, or HATCHEL. See the article HATCHEL.

HITCHING, a market-town in Hartfordfhire, fourteen miles north-weft of Hartford, and thirty-two north-weft of London.

HITHE, or HYTHE, in our old writers, denotes a port, wharf, or fmall haven, to embark, or land wares at; as Queenhithe, &c.

HITHE is alfo one of the Cinque Ports in the county of Kent, fituated on the englifh channel, fix miles weft of Dover.

HIVE, *alveare*, in country affairs, a convenient receptacle for bees. See BEE.

There are feveral forts of hives ufed in different counties of England, as wicker-hives, made of privet; willow, or harl-hives, daubed with cow-dung tempered with duft; or hives made with ftraw

ſtraw bound with brambles. Some alſo, out of curioſity to ſee the bees work, have them made of wood with glaſs-windows, or ſides; but theſe are very cold, ſo that bees ſeldom thrive in them. The moſt uſual form of them is conical, or bell-faſhioned; and the beſt and warmeſt materials for making them are ſtraw and oſier, nicely twiſted and matted together. Of theſe there ſhould be kept ſeveral ſizes, ſo as to ſuit a bigger or leſſer ſwarm; and where you deſign to multiply your ſtock, make uſe of the ſmall ones, and of the larger where you deſire a great deal of honey. See HIVING, and HONEY.

HIVING *of Bees*, the placing a ſwarm of them in a hive, provided for that purpoſe. See the article HIVE.

When a ſwarm of bees has left an old hive, and is placed in the form of a cluſter hanging down from the branch of ſome tree or ſhrub, turn up the hive, and ſhaking the bough, make them fall into it, and then ſet the hive upon a cloth on the ground; or if the bough be ſmall, you may cut it off, and laying it on the cloth, ſet the hive over it: but if the bees are fixed on a branch near the ground, lay the cloth under it, then ſhake them down and place the hive over them. If it happen that ſome bees will obſtinately keep to the place where they at firſt fixed themſelves, after having tried in vain to ſweep them off gently with a bruſh, rub the branch with the juice of wormwood, rue, elder, or of ſuch other plants as they hate the ſmell of, and if this does not ſucceed, linen rags muſt be burnt under them, the ſmoak of which will ſoon drive them off, and make them join their companions. It ſometimes happens, that the ſwarm is not placed ſo favourably as in the inſtances before-mentioned; they often hang themſelves in long cluſters, on the ſmall branches of high trees, and in this caſe, many different expedients are to be uſed to hive them, according to the circumſtances of their poſition. The common method is for one man to climb the tree with a long ſtaff in his hand, and another to mount a ladder placed againſt the tree, and to hold the hive under the ſwarm, while the other ſweeps them into it with the ſtaff; and when the bough on which they hang is ſo far from the body of the tree, that this is impracticable by the ladder, the hive is to be fixed to the end of a long pole, and by that means held under the ſwarm while they are ſwept into it. When all this is impracticable, by reaſon of the great height of the branch on which the ſwarm hangs, a large cloth is to be ſpread on ſome of the lower branches, and the whole ſwarm ſwept down in a cluſter upon it; this is then to be thrown carefully to the ground, and another perſon is to be ready there to whelm the hive over the greater part of the cluſter, and the reſt will ſoon creep into it, and join them. If they are ſlow in doing this, they are to be driven in by burning linen rags about the places where they fly, the diſagreeable ſmell of which will ſend them towards the hive, where finding their companions not incommoded with it, they will naturally remain.

Sometimes the bees that go out in a ſwarm fix upon a hole in a wall, or a hollow in the trunk of a tree. This is a much better choice for them than the branch of a tree; but it is much worſe for the perſon who is to hive them, for they are very difficult to be got out. The common way is to attack theſe ſwarms in the middle of a cold night, to enlarge the opening from without, and placing the hive under it, to ſcoop the bees out with a ladle, and put them into the hive.

It ſometimes happens, that the ſwarms part, and light in ſight of one another; in which caſe, if the leſſer part are diſturbed, they will fly to the greater: but if they are not in ſight of each other, hive them both in two ſeveral hives, and ſhaking the bees out of one hive on the cloth on which the other hive ſtands, place that hive over them, and they will all take to it.

If your ſwarm happens after the middle of June, and are ſmall, put two or three of them together, even whether they ariſe the ſame day, or ſeveral days after; for by thus uniting them, they will labour the more carefully, gather ſtore of honey, and ſtoutly defend themſelves againſt all enemies. As to the manner of uniting them in one hive, it is thus performed: having ſpread a cloth on the ground, near the ſtool on which this united ſwarm is to ſtand, ſet a pair of reſts, or two ſupporters for the hive; then in the evening when it grows dark, knock down the hive out of which you intend to remove your bees upon the reſt; then lift up the hive a little, and clapping it between your hands to ſhake out the bees that ſtick in it, lay it down ſideways by thoſe inſects, and

and ſet the ſtock or ſwarm to which you would add them, upon the reſts over them; upon which they will immediately aſcend from the cloth underneath into the hive, and if any remains in the other hive, they will haſten after their companions. When you have gotten them all in, place the hive on the ſtool, which ſhould be done either that night, or early the next morning. Some reckon it better to place the hive in which the ſwarm is newly put, with a view to its being drove into another, with the ſkirts uppermoſt, and to ſet the other upon it, binding them about the ſkirts with a towel, and in this manner to let them ſtand till the morning, by which time all the bees will have aſcended, ſo that you may then ſet the receiver on a ſtool. Thus three or four ſwarms may be put together. But they ought to be united the ſame evening after they have ſwarmed; becauſe after having made combs, they are the more unwilling to part from them.

In theſe ſeveral methods of hiving bees, people ought to defend themſelves as carefully as poſſible againſt their ſtings; the ſecureſt way of doing which, is to have a piece of gauze, or coarſe muſlin, large enough to come over the perſon's hat, and to reach down to the collar of his coat behind, and to his breaſt before, which being kept at a little diſtance from his face by his hat, he may ſee what he does without the leaſt danger: he ought alſo to ſecure his hands by wearing a good pair of gloves; and woollen ones are the beſt for this purpoſe.

HOACHE, in natural hiſtory, a kind of earth approaching to the nature of chalk, but harder, and feeling like ſoap; whence ſome think that it is either the ſame with our ſoap-rock of Cornwal, or very like it. The Chineſe diſſolve it in water, till the liquor is of the conſiſtence of cream, and then varniſh their china-ware with it.

HOACTLI, in zoology, the name of an american bird deſcribed by Nieremberg: it is of the ſize of a common hen, the legs and neck are long; its head is black, and is ornamented with a beautiful creſt of the ſame colour; its whole body is of a fine white, but its tail is grey, as are alſo the upper ſides of its wings; the wings have a greeniſh caſt, and the back ſometimes has many black feathers; its feet are not webbed, its legs are of a pale whitiſh colour; it has a circle of white, beginning at the eyes, and going round the head: it is common on the lakes of Mexico, and builds among reeds and ſedge. It bites very deſperately.

HOAR-FROST. See FROST.

HOAR-HOUND, or HOREHOUND, *marrubium*, in botany. See MARRUBIUM.

HOARSENESS, *raucedo*, in medicine, a diminution of the voice, ſometimes attended with a preternatural aſperity, or roughneſs thereof.

The part here affected, is the aſpera arteria, and its larynx, which laſt chiefly forms the voice. See the articles ASPERA ARTERIA, and LARYNX.

The proximate cauſe is too great an effuſion of thin lymph upon the part. It is a catarrhal affection from a too ſharp ſalt, or acid lymph. Etmuller, in a very obſtinate hoarſeneſs, preſcribes ſpermaceti as an approved remedy; as alſo, decoct. raporum, and rob. paſſulorum.

In an inveterate hoarſeneſs, where a viſcid mucus, or thick lymph is the cauſe, diſſolving and expectorating medicines are convenient; and above all, ſyrup de eryſimo, oxymel ſillitic. and balſ. ſulph. Bleeding is to be avoided, for it prolongs the diſtemper.

Sometimes worms in the inteſtines are the cauſes of hoarſeneſs.

HOBBY, the name of a hawk, called by authors ſubbuteo.

It is a hawk of the lure, and not of the fiſt; and is very like the ſaker, only much leſs. It makes excellent ſport with net and ſpaniels; for when the birds ſee the hobby, they dare not commit themſelves to the wing, but lie cloſe to the ground, and ſo are taken in the nets.

HOCHSTET, a town of Swabia in Germany, ſituated twenty-five miles northeaſt of Ulm.

HOD, an inſtrument uſed to carry bricks and mortar in, up ladders, &c. to build or repair houſes, &c. with.

HODMAN, an appellation given to a young ſtudent admitted into Chriſt's College in Oxford, from Weſtminſter-School.

HODNET, a market town of Shropſhire, ten miles north-eaſt of Shrewſbury.

HODSDON, a market-town of Hertfordſhire, ſeventeen miles due north of London.

HOE, in country affairs, a tool made like a cooper's addz, to cut upwards in gardens, fields, &c. This tool is commonly called the hand-hoe: for other ſorts of hoes ſee the next article.

This inſtrument is of great uſe, and ſhould be more employed in hacking and clearing the ſeveral corners, cracks and

patches

patches of land, in ſpare times of the year, which would be of no ſmall advantage thereto.

Prong HOE. See the article PRONG.

HOEING, according to Tull, is the breaking and dividing the ſoil by tillage, whilſt the corn, and other plants are growing thereon.

It differs from common tillage (which is always performed before the corn or plants are ſown or planted) in the time of performing it; and it is much more beneficial to the crops than any other tillage. This ſort of tillage is performed various ways, and by means of different inſtruments. See PLOUGH.

Land, which before tilling would have yielded little, tho' the more it is tilled before ſowing, the greater plenty of crop it yields, yet if tilled only before the ſowing will always have ſome weeds, and they will partake of the advantage of the tillage as well as the corn. This is one reaſon for an after tillage, ſuch as that by hoeing. But there is another conſideration that yet more requires it, this is, that as ſoon as the ploughman has done his buſineſs by plowing and harrowing the land after ſowing, the ſoil of its own accord begins to undo it all again by tending towards its original texture and ſpecific gravity, the altering of which was the only buſineſs of all the former tillage. The breaking the particles of the earth, and making in it new pores and new ſuperficies, is the great buſineſs of the plough and harrow, but as ſoon as their uſe is over, the earth begins to coaleſce again to its own form, the particles unite together, and the artificial pores in a great meaſure cloſe up. The ſeed is nouriſhed in a worſe ground than it was at firſt put into, and the more the plant grows up and requires a larger ſupply of food, the worſe the paſture becomes: while nouriſhment is thus denied the growing plants, they are at the ſame time choaked with weeds, which being of a hardier nature than they, will grow with leſs ſupplies, and therefore thrive more vigorouſly and rob them of a great part of the little food the land before allowed them.

Tranſplanting is nearly allied to hoeing, but it is much inferior; the nature of this will not admit of its being a general thing, and even if it would, hoeing is better, for by tranſplanting, the plants can only be kept up to a certain period, after which they will not bear it; but hoeing may be uſed to them with advantage, to their utmoſt ſtanding, and makes them vigorous all the while. The roots of a plant are neceſſarily broken off in tranſplanting, and it requires ſome time for it to ſtrike a whole ſet of new ones, and if the earth about it is not kept thoroughly moiſtened all this time, the new formed roots will not be able to ſhoot, and the plant will ſtarve in the midſt of plenty; but on the contrary, in hoeing the ſame advantage of a new paſture for the plant is obtained by breaking the particles of earth, and at the ſame time no more of the roots are broken off than can eaſily be ſupplied, and the reſt remaining in their places, the plant continues growing without that ſtop and decay which muſt happen on tranſplanting, and which it recovers only by degrees.

One great benefit of hoeing, is, that it keeps plants moiſt in dry weather, the advantage of which to their growth is eaſily ſeen. This good office it performs on a double account; firſt as they are better nouriſhed by hoeing, they require leſs moiſture, and conſequently carry off leſs; for theſe plants, which receive the greateſt increaſe, having moſt terreſtrial nouriſhment, carry off the leaſt water in proportion to their augment, as is proved by Dr. Woodward's experiments. Secondly, the hoe, particularly the horſe-hoe, for the other does not go deep enough, procures moiſture for the roots from the dew that falls moſt in dry weather, and theſe dews ſeem to be the moſt enriching of all moiſture, as it contains in it a fine black earth, which will ſubſide from it in ſtanding, and which ſeems fine enough to be the proper pabulum or food for plants.

For a comparative view of the profits ariſing from the common and horſe-hoeing huſbandry. See HUSBANDRY.

HOG, *ſus*, in zoology, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the upper fore-teeth are four in number, and are convergent; thoſe of the lower jaw are eight, and are patulous: the canine teeth of the upper jaw are two, and very ſhort; thoſe of the under jaw are ſingle, and exerted: the crown of the head is carinated, and the hoof is divided. See the article SWINE.

Beſides the common hog, there are ſeveral other ſpecies, as, 1. The american hog, with the back briſtly behind, and with

a naked tail. 2. The musk hog, with a cyst, or gland on the back, in which is secreted a perfumed fluid; its tail is naked. 3. The babyroussa, with two teeth growing on the forehead.

HOG'S DUNG is, by Mortimer, reckoned one of the richest manures we are acquainted with, and the next in value to that of sheep's dung, and is found to be equal in virtue to twice the quantity of any other dung, except this. The antients seem to have been displeased with it, on account of its breeding weeds, but this is only accusing it of being too rich, for any dung will do this when laid too thick. It is an excellent manure for pasture-grounds, and excels all other kinds of dung for trees. The farmers who use this dung for their lands, generally take care to save it, by well paving the styes, and encrease the quantity by throwing in bean-stalks, stubble, and many other things of a like nature; and by good management of this kind many farmers have procured fifty or sixty loads of excellent manure a year, out of a small stye. The very best way of using this dung, is to mix it with horse-dung; and for this reason it is best to have the stye near the stable, that the two cleansings may be mixed in one heap, and used together. They have in many parts of Staffordshire a poor, light, shallow land, on which they sow a kind of white-pea: the land is neither able to bear this, nor any thing else, to advantage for their reaping; but when the peas are ripe, they turn in as many hogs as the quantity of pease will fatten, suffering them to live at large, and remain there day and night; in consequence of this the land will produce good crops of hay for several years afterwards; or if too poor for that, it will, at worst, raise grass enough to make it a good pasture-ground.

Hedge HOG, *erinaceus,* in zoology, a genus of quadrupeds, the lateral fore-teeth of which are shorter than the others; the nostrils are cristated; and the body, instead of hairs, is clothed, in the manner of that of the porcupine, with spines. See QUADRUPED and PORCUPINE.

Of this genus there are two species. 1. The erinaceous, with larger ears, or the common hedge-hog, being a little animal, considerably thick in proportion to its length, and which, when it draws itself together at the approach of danger, appears of an oval figure. The length of this creature is about seven inches; its head small and oblong, broad towards the upper-part, and growing smaller towards the nose; the mouth is formed very much like that of the badger; the eyes are small, black, and protuberant; the ears are short and broad; the neck is short; the back broad and prominent; the legs short and robust; the feet formed like those of the dog; there are five toes on each, and one is shorter than the rest, in manner of a thumb. The other species is the white erinaceous, with very small ears, being larger than the common hedge-hog, but very like it in form.

Musk HOG, *Tajacu,* in zoology. See the article TAJACU.

HOG-STEER, among sportsmen, denotes a wild boar three years old.

HOG'S FENNEL, a plant called by botanists peucedanum.

HOG'S PLUM, a plant otherwise called spondias. See the article SPONDIAS.

HOG'S WEED, a plant called by Linnæus boerhaavia.

HOGENHINE, in our antient saxon laws, signifies one that came as a guest to an inn, and continued there the third night, from which time he was accounted of that family; so that if he offended against the king's peace, his host was to be answerable for him.

HOGSHEAD, in commerce, a measure of capacity, containing sixty-three gallons. See the articles GALLON and MEASURE.

HOGUE, a town and cape on the northwest point of Normandy in France, near which admiral Rook burnt the french admiral's ship called the Rising-sun, with twelve more large men of war: west longitude 2°, and north latitude 49° 50′.

HOHIO, a river of North America, which rising in the Apalachian mountains, near the confines of Carolina and Virginia, runs south-west, and falls into the river Missisippi.

HOISE, or HOYSE, a term used by seamen, for hawling up any thing into the ship, or the getting up a top-mast, yard, or the like.

HOITLALLOTL, in zoology, the name of an american bird, described by Nieremberg, and called by him *avis longa.* It is very remarkable for the swiftness of its running, and is of a very long shape, having also a long tail: its beak is also very long, black above, and grey underneath: its tail is green, and has all the splendor and beauty of the peacock's: its

its whole body is of a whitiſh yellow, and, near the tail, of a blackiſh yellow; but the ſhoulders are black, with white ſpots. It does not fly high, nor very well, but runs ſo ſwiftly as is ſcarce to be conceived. It is but an ill taſted bird.

HOKE-DAY, the Tueſday after eaſter-week; which was the day on which the Engliſh conquered and expelled the Danes: this was therefore kept as a day of rejoicing, and a duty, called hoke-tueſday-money, was paid to the landlord, for giving his tenants and bondmen leave to celebrate it.

HOLCUS, INDIAN MILLET, in botany, a genus of the polygamia-monoecia claſs of plants, the corolla of which is a glume, furniſhed with a triple ariſta or awn; the ſtamina are three, the ſtyles two, and the ſeed ſingle.

HOLD, that part of a ſhip which lies between the keelſon and the lower-deck; in which, divided by bulk-heads, are the ſteward's room, powder room, bread-room, and the boatſwain's and carpenter's ſtore-rooms. In a merchantman, all the goods and lading in general, are ſtowed in the hold.

HOLD-FAST, a large piece of iron, in the ſhape of the letter S, fixed into a wall, to ſtrengthen it. Alſo a tool uſed by joiners, carvers, &c. which goes through their benches, to hold faſt ſuch work as cannot be finiſhed by its being held in the hand.

HOLDE, in old law books, ſignifies the bailiff of a city or town: and according to ſome writers, it alſo ſignifies a general.

HOLDERNESS, a peninſula in the eaſt riding of Yorkſhire, which has the German ocean on the eaſt, and the river Humber on the ſouth.

HOLIBUT, a name ſometimes given to the turbot. See the article TURBOT.

HOLLAND, one of the United Provinces: it is about one hundred miles long, from north to ſouth, and ſcarce thirty miles broad; but enjoys the greateſt trade of any province in the world, and in point of ſtrength and riches is equal to the other ſix united provinces. It is ſituated one hundred miles eaſt of England, and is bounded on the north and weſt by the German ſea, on the eaſt by the Zuider-ſea, and on the ſouth by the provinces of Zealand and Utrecht.

HOLLAND is alſo the name of the ſouth-eaſt diviſion of Lincolnſhire.

HOLLAND, in commerce, a fine and cloſe kind of linen, ſo called from its being firſt manufactured in Holland. See the article LINEN.

HOLLOW, in architecture, a concave moulding, about a quarter of a circle, called by ſome a caſement, and by others, an abacus.

HOLLOW-SQUARE, in the military art, a body of foot drawn up, with an empty ſpace in the middle for colours, drums, and baggage.

HOLLOW-TOWER, according to Harris, is a rounding made of the remainder of two briſures, to join the curtin to the orillon, where the ſmall ſhot are played, that they may not be ſo much expoſed to the view of the enemy.

HOLLY, *aquifolium*, in botany, is ranked by Linnæus among the ilices. See the article ILEX.

Holly-hedges make an excellent fence; but are liable to periſh in ſevere winters. See the article HEDGE.

The timber of holly is the whiteſt of all hard wood, and therefore uſed by inlayers. It is alſo uſed by mill-wrights, turners, &c.

Knee-HOLLY, a name given to butcher's broom.

Sea HOLLY, a plant more uſually called eryngium. See the article ERYNGIUM.

HOLM ſignifies an iſland in a river: alſo a hill or cliff.

HOLM is alſo a port and market-town of Cumberland, ſituated on Solway-frith, twenty miles weſt of Carliſle.

HOLOCAUST, a burnt offering, or ſacrifice, wholly conſumed by fire: of this kind was the daily ſacrifice in the jewiſh church. This was done by way of acknowledgment, that the perſon offering and all that belonged to him, were the effects of the divine bounty. The heathens, who alſo offered holocauſts, probably conſidered them in the ſame light: and the diſpoſing of ſacrifices this way was the general cuſtom, till Prometheus introduced the cuſtom of burning only a part, and retaining the remainder for his own table.

HOLOGRAPH, among civilians, a will wholly wrote by the hand of the teſtator.

HOLOMETER, a mathematical inſtrument that ſerves univerſally for taking all meaſures, both on the earth and in the heavens.

HOLOSTEUM, in botany, a genus of the pentandria-trigynia claſs of plants, the corolla whereof is compoſed of five plane, patent, tridentated petals, broadeſt towards

towards the ends; the fruit is a cylindrico-conic capsule; the receptacle is free, obsoletely triquetrous, and has very short hairs; the seeds are numerous and triquetrous. There is a species of this genus, in which the stamina are only four instead of five.

HOLSOM, in the sea-language, is said of a ship that will ride well, without rolling or labouring.

HOLSTEIN, a dutchy of Germany, in the circle of Lower Saxony, one hundred miles long, and fifty broad. It is bounded by Slesvic or South Jutland on the north, by the Baltic sea and the dutchy of Sax-Lawenburg on the east, by the river Elbe on the south, and by the German sea on the west.

HOLY-GHOST, one of the persons of the holy Trinity. See GOD and TRINITY.

Order of the HOLY-GHOST, the principal military order in France, instituted by Henry III. in 1569. It consists of an hundred knights, who are to make proof of their nobility for three descents. The king is the grand-master, or sovereign, and as such, takes an oath on his coronation day, to maintain the dignity of the order.

The knights wear a golden-cross, hung about their necks by a blue silk ribbond, or collar. But before they receive the order of the Holy Ghost, that of St. Michael is conferred as a necessary degree; and for this reason their arms are surrounded with a double collar.

HOLY-THURSDAY, the same with ascension-day. See ASCENSION.

HOLY-DAYS, the same with festivals. See the article FEAST.

HOLY-ROOD DAY, a festival otherwise called the exaltation of the cross. See the article CROSS.

HOLY-HEAD, a cape and town in the isle of Anglesea, situated in the irish channel: west longitude 4° 45′, and north latitude 53° 26′.

HOLY-ISLAND, an island in the German sea, six miles south of Berwick upon Tweed: west long. 1° 42′, and north lat. 55° 45′.

HOLY-WELL, a town of North Wales, in Flintshire, ten miles east of St. Asaph.

HOLYNESS denotes purity, or a person free from sin.

HOLYNESS is also a title given to the pope, by those of his communion.

HOMAGE, in law, is the submission, loyalty, and service which a tenant promised to his lord, when he was first admitted to the land which he held of the lord in fee: also that owing to a king, or to any superior.

In the antient grants of lands and tenements in fee, the lord not only obliged his tenants to perform certain services, but likewise took a submission, with promise or oath that they should be true to him as their lord and benefactor.

The lord of the fee of lands, for which homage is due, takes it of every tenant as he comes to the land; but none can either do, or receive homage, except such persons as have estates in fee simple or tail, in their own right, or the right of another.

HOMAGE AUNCESTREL, is where a person and his ancestors, time out of mind, held land of the lord and his ancestors by homage. Such lord was to acquit his tenant against all other lords above him, and from all other service.

HOMAGE-JURY, a jury in a court-baron, consisting of tenants that do homage to the lord of the fee.

This jury makes enquiry into, and presentments of defaults and deaths of tenants, and of admittances and surrenders into the lord's court.

HOMAGER, a person bound to do homage to another.

HOMAGIO RESPECTUANDO, a writ, by which the escheator was commanded to deliver lands to the heir of the king's tenant, notwithstanding his homage was not done.

HOMAGIUM REDDERE has been used to signify, to renounce homage; as where the tenant or vassal made a solemn declaration of disowning his lord, for which there was a form prescribed by the feudatory laws.

HOMBERG, a town of Germany, in the circle of the Upper Rhine, and landgraviate of Hesse, situated ten miles north of Francfort: east long. 8° 24′, north lat. 50° 20′.

HOMBERG is also a town of Germany, in the palatinate of the Rhine, and dukedom of Deuxponts: east long. 7° 6′, and north lat. 49° 20′.

HOMER, OMER, CORUS, or CHOMER, in jewish antiquities, a measure containing ten baths, or seventy-five gallons, and five pints, as a measure for things liquid; and thirty-two pecks and one pint, as a measure for things dry. The homer was most commonly a measure for things dry, and the greatest that was used among the Jews; it contained, according

cording to the Rabbins, ten ephaps, or thirty fata or feahs. Corus is the moft ufual term in the hiftorical writers, and homer, omer, or chomer, among the prophets.

HOMICIDE, the flaying or killing a perfon. This is divided into two forts, voluntary and cafual: voluntary, is that which is done with deliberation, and a full purpofe to kill; and, when done out of malice prepenfed, is murder: cafual homicide, is where the death of a perfon happens by chance, or without any intention to kill; which is man-flaughter, or chance-medley.

HOMILY, in ecclefiaftical writers, a fermon, or difcourfe, upon fome point of religion, delivered in a plain manner, fo as to be eafily underftood by the common people.

At the time of the reformation there were feveral of thefe homilies made and printed, and ordered to be read in fuch churches as were not provided with a fufficiently learned minifter, in order to prevent unfound doctrine being taught in remote country places.

In the primitive church, homily rather meant a conference or converfation by way of queftion and anfwer, which made part of the office of a bifhop, till the Vth century, when the learned priefts were allowed to preach, catechize, *&c.* in the fame manner as the bifhops ufed to do.

There are ftill extant feveral fine homilies, compofed by the antient fathers, particularly St. Chryfoftom and St. Gregory.

HOMINE ELIGENDO, *&c.* in law, is writ directed to a corporation, for the election of a new perfon to keep one part of the feal, appointed for ftatutes-merchant, when a former party is dead.

HOMINE REPLEGIANDO, in law, is an antient writ that lies for bailing a perfon out of prifon, where any one is confined without commandment of the king or his judges; or for any caufe that is replevisable. This writ is directed to the fheriff, commanding him to replevy the prifoner.

In cafe a perfon takes away fecretly, or keeps in his cuftody any perfon againft his will, on oath made thereof, and a petition to the lord-chancellor, he will grant a writ of replegiari facias, upon which the fheriff returns an elongatus, and then there iffues a capias in withernam, to take the party fo offending.

HOMINE CAPTO IN WITHERNAM, in law, is a writ for apprehending a perfon who has taken any other man or woman, and conveyed him or her out of the county, fo that they cannot be replevied by law.

HOMOCENTRIC, the fame with concentric. See the article CONCENTRIC.

HOMOCHROA, in natural hiftory, a genus of foffils, confifting of ftones compofed of a cryftalline matter, confiderably debafed by earth, and this of various kinds in the different fpecies; but ever of one kind only in the fame ftone, which is thence always of one plain and fimple colour, and never fubject to veins or other variegations.

Of this genus authors reckon five fpecies. 1. The white homochroum, from half an inch in diameter, to feven or eight inches. 2. The red homochroum, from one inch or lefs in diameter, to two or three. 3. The yellow homochroum of various fizes, from one inch or lefs in diameter, to fix or feven. 4. The bluifh homochroum, whofe general fize is two inches in diameter. And 5. The greenifh homochroum, from half an inch to two inches in diameter.

All thefe fpecies are of an orbicular form a compact and a clofe texture, and freely give fire with fteel.

HOMODROMUS VECTIS, that kind of lever, in which the weight is in the middle, between the power and the fulcrum; or the power in the middle between the weight and the fulcrum.

HOMOGENEOUS, or HOMOGENEAL, an appellation given to things, the parts of which are fimilar or of the fame nature and properties.

HOMOGENEOUS LIGHT, that whofe rays are all of one colour and degree of refrangibility, without any mixture of others. See the article COLOUR.

HOMOGENEOUS SURDS, thofe which have the fame radical character, or figns, as $\sqrt[2]{a}$, and $\sqrt[2]{b}$. See the article SURD.

HOMOGENEUM COMPARATIONIS, in algebra, is ufed by Vieta, for the abfolute number in quadratic, cubic, *&c.* equations; which number always poffeffes one fide of the equation, and is the product of the roots multiplied into one another. See the article EQUATION.

HOMOLOGOUS, in geometry, an appellation given to the correfponding fides and angles of fimilar figures, as being proportional to each other.

Thus, in two fimilar triangles A B C, DEF, (plate CXXXIII. fig. 1.) the fides

AB and DE, BC and EF, and AC and DF are homologous. And these triangles are to each other as the squares of their homologous sides. See the article TRIANGLE.

HOMOLOGOUS THINGS, in logic, those which agree in name, but are of different natures.

HOMONYMOUS, an appellation given to words which have two different significations, being the same with equivocal terms.

HOMSOKEN, a privilege enjoyed by every person, in his own house or home, which ought not to be invaded. See the article HAMSOKEN.

HONAN, a province of China, bounded by those of Xansi and Pekin, on the north, by Xantong and Nankin on the east, by Suchuen on the south, and by Xensi on the west; lying between 33° and 37° north latitude. Its capital is Caifum.

HONDURAS, a province of Mexico, in North America; which, including the country of the Moskito-indians, is situated between 85° and 94° west long. and between 12° and 16° north latitude.

HONE, a fine kind of whetstone, used for setting razors, pen knives, and the like. See the article COS.

Hones pay, on importation, a duty of 9 s. $6\frac{90}{100}$ d. per hundred, and draw back 8 s. $7\frac{1}{2}$ d.

HONEY, *mel*, is, in general, a thick, viscous, and more or less fluid substance, of a whitish or yellowish colour, sweet to the taste, soluble in water, becoming vinous in fermentation, inflammable, liquable by a gentle heat, and of a fragrant smell.

There are three distinctions of honey, according to its purity, fluidity, and the manner in which it has been procured from the honey-combs. The first and finest kind is virgin-honey, or the first produce of a swarm, obtained from the combs without pressing; these being only set to drain, in order to its running out. The second kind is that known by the name of white-honey, being thicker than the former, and often indeed almost solid: it is procured by pressing the combs, but without the assistance of heat. The third and worst kind is the common yellow honey, obtained from the combs first heated over the fire, and then pressed.

Honey is prepared in the nectaria, or honey-glands of plants, situated in their flowers; the only office of the bees is to collect the small quantities lodged there, and to amass them in stores capable of furnishing themselves with food, and us with a supply sufficient for our purposes. The bee that is out in search of honey, no sooner sees a flower that it likes, than it settles on it, and seizing on these glands, it sucks from them all the sweet juice they contain, which is either absolute honey, or very easily changed into such. The honey thus taken into the body of the bee, and deposited again into the cells of the honey-comb, is destined not only for the food of the young offspring, while unable to go out and help themselves, but for the sustenance of the bees themselves in bad weather, or when there is no food for them abroad.

Notwithstanding, however, that honey is known to be originally lodged in the flowers of plants, and might seem to be always ready in sufficient quantities for the bee; yet it is necessary that several circumstances concur, in order to its being fine and perfect in its kind. Among these are, a warm and serene state of the air, during the time in which the bees are most of all employed in making it, and a good state of health in the bee, as also its being made at a time when many fragrant plants are in flower, and in a place where such grow not too far off.

Honey taken out of the new combs early in the summer, is vastly preferable to that taken from the same hive in autumn. The reason of this is, that the bees, during the time of their making the former, have been in a more healthy and vigorous state, and that there have been fragrant flowers in greater number and perfection at that season, than later in summer.

Honey is an excellent pectoral, and is detergent, aperient, and diuretic. It should always be clarified, by melting it over the fire, either alone, or with the whites of eggs, taking off the scum, before it is used in medicine. The chemists pretend to have made an acid spirit from it, which is a solvent for gold; but we have only their assurance of it, no body else having ever seen such a liquor.

Honey, imported, pays 7 s. $8\frac{40}{100}$ d. the barrel, and draws back 6 s. 9 d. Or each ton, imported, pays 2 l. 6 s. $2\frac{40}{100}$ d. and draws back 2 l. 0 s. 6 d.

HONEY-COMB, a waxen structure, full of cells, framed by the bees, to deposit their honey and eggs in. See BEE and WAX.

The construction of the honey-comb seems one of the most surprising parts of the

the works of insects, and the materials of which it is composed, which, though evidently collected from the flowers of plants, yet do not, that we know of, exist in them in that form, has given great cause of speculation to the curious. The regular structure of the comb is also equally wonderful. When the several cells in it are examined, it should seem that the nicest rules of geometry had been consulted for its composition, and all the advantages that could be wished, or desired, in a thing of that kind, are evidently found in it. Each cell consists of six plane sides, which are all trapeziums, but equal to each other: the bottom of the cell is contrived with three rhombuses HKDI, DEFI, and FGHI (plate CXXXIII. fig. 3. n° 1.) so disposed as to constitute a solid angle at I, under the three equal angles DIH, DIF, and HIF, each of which is double the maximum angle of $54^{\circ} 44' = DIK = DKI$. Hence it comes to pass, that a less quantity of surface is sufficient to contain a given quantity of honey, than if the bottom had been flat, in the proportion of 4658 to 5550, as has been found by calculation; that is, nearly a fifth of the whole, so far as the figure in the end of the cells extends, in each; which fifth part of wax and labour saved, amounts to a vast deal in the whole comb. And if these admirable insects knew their advantage, they could not more nicely observe the rules of modern geometry. Hence we may observe, that though the rules of discovering the maxima and minima of quantities by fluxions, is a part of knowledge which the mathematicians have but lately acquired, and which they esteem the sublimity of human science, yet this very thing was imparted to these insects at the creation. See the article ALVEOLUS.

The method of making two sorts of cells in each comb, is also admirably contrived to save the expence of wax, since had they been made single, every comb must have had its peculiar base, and every set of cells their bottom of wax, whereas one bottom now serves for two cells; and there is but one plate of wax in the center of a double comb.

This structure occasions a very great sparing of the wax, or matter of the comb: but besides this there is another great advantage resulting from this structure, which is, that the angles arising from the forementioned combination of the bases, greatly strengthen the whole work.

The sides of the cells are all much thinner than the finest paper, and yet they are so strengthened by their disposition, that they are able to resist all the motions of the bee within them, as they are frequently obliged to be. The effect of their thrusting their bodies into the cells, would be the bursting of those cells at the top, were not this well guarded against. But to prevent this, the creatures extend a cord, or roll of wax, round the verge of every cell, in such a manner that it is scarce possible they should split in that particular part. This cord or roll is at least three times as thick as the sides of the cell, and is even much thicker and stronger at the angles of the cells, than else where, so that the aperture of each cell is not regularly hexagonal, though its inner cavity be perfectly so. See fig. *ibid.* n° 2.

The several combs are all placed parallel to one another (*ibid.* n° 3.) and there is such a space left between them, that the bees can easily pass: and often they place a part of the comb in a contrary direction to the rest, so that while the others are placed horizontally, these stand perpendicularly. The cells which have served, or are to serve for the habitation of the worms of the common, and of the male bees, are often made also at other times the receptacles of honey; but tho' these are indifferently made to serve either use, there are others destined only to receive honey.

The celerity with which a swarm of bees received into a hive, where they find themselves lodged to their minds, bring their works of the combs to perfection, is amazing. There are vast numbers at work all at once; and that they may not incommode one another, they do not work upon the first comb till it is finished, but when the foundation of that is laid, they go to work upon another, so that there are often the beginnings of three or four stories made at once, and so many swarms allotted to the carrying on the work of each. It would be a desirable thing to see the bees at work, in making these elegant and regular fabrics; but it is scarce possible to see any thing of this kind distinctly, even with the advantage of glass-hives; for, as Mr. Reaumur observes, no bee ever works singly upon this occasion, but wherever the fabric is erecting, there are numbers together trying to assist each other, and their motions are so swift, and so hid by their standing before one another,

other, that very little is to be seen of them. New bees are every moment going to the place, and old ones going away; and very frequently those which arrive late are dispatched away immediately after they arrive: there are only some very short moments in which the glass of the hives can give a view of the creatures regularly employed at their work; for the moment one sees a bee at work in building, that moment we see one either fly off, or else another get before her, so as to hinder the view: however, it is plain that the bee uses her teeth, in modelling and fashioning the wax.

HONEY-COMB, in gunnery, is a flaw in the metal of a piece of ordnance, when it is ill cast and spongious.

HONFALIZE, or the HOFATIZE, a town of the austrian Netherlands, in the province of Luxemburg: east long. 5° 45′, and north lat. 50° 15′.

HONFLEUR, a port-town of France, in the province of Normandy, situated on the south side of the river Seyne, near the English channel: east longitude 15′, and north latitude 49° 24′.

HONITON, a borough-town of Devonshire, twelve miles east of Exeter.

It sends two members to parliament.

HONOUR, a testimony of esteem or submission, expressed by words, actions, and an exterior behaviour by which we make known the veneration and respect we entertain for any one, on account of his dignity or merit. The word honour is also used in general for the esteem due to virtue, glory, and reputation. It is also used for virtue and probity themselves, and for an exactness in performing whatever we have promised; and in this last sense we use the term, *a man of honour*. But honour is more particularly applied to two different kinds of virtue, bravery in men, and chastity in women.

Virtue and honour were deified among the antient Greeks and Romans, and had a joint temple consecrated to them at Rome: but afterwards each of them had separate temples, which were so placed, that no one could enter the temple of Honour, without passing through that of Virtue; by which the Romans were continually put in mind, that virtue is the only direct path to true glory. Plutarch tells us, that the Romans, contrary to their usual custom, sacrificed to Honour uncovered; perhaps to denote, that wherever honour is, it wants no covering, but shews itself openly to the world.

HONOUR, is also used for a signory or lordship, on which inferior lordships and manors depend; for as a manor consists of several lands, tenements, services, and customs, so an honour contains several manors, knight-fees, &c.

HONOURS *of the church*, are the rights and privileges belonging to the patron, &c. as a seat and sepulchre in the chancel, the being first served with the consecrated bread and wine, &c.

HONOURS *of the city*, are the public offices and employments thereof: thus he who had been constable, overseer of the poor, and churchwarden of his parish, common-council-man, alderman, and lastly mayor, has passed all the honours of the city. See the article CITY.

HONOUR-COURTS, are courts held within the honours of seigniories.

Funeral-HONOURS are the ceremonies performed at the interment of the great, as hangings, hearses, funeral harangues, &c. See the article FUNERAL.

Maids of HONOUR, are six young ladies in the houshold of the queen, and princess royal; the salary of those of a queen are 300 l. *per ann.* each, and those of the princess dowager of Wales, 200 l.

HONOUR-POINT, in heraldry, is that next above the center of the escutcheon, dividing the upper part into two equal portions. See the article POINT.

HONOURS *and ruff*, a well-known game at cards, wherein all the duces are kept in the pack; by which means, as four play (two being of a side), twelve is dealt to each person, and there remain four for the stock, whereof the uppermost is turned up for trump; he that hath the ace of that suit, ruffs, that is, he takes in those four cards, and lays out four others in their place. The honours are the ace, king, queen, and knave; and he that hath three of these honours in his own hand, his partner not having the fourth, sets up eight by cards, that is two tricks; if he hath all four, then sixteen or four tricks; and here observe, that it is all one, if the two partners make three or four honours between them, as if one had them. If the honours are equally divided among the players, they then say, *honours are split*. If either side are at eight groats, any of the partners has the benefit of calling *can you?* provided he has two honours in his hand; and if his partner answers *one*, the game is up, which is nine in all: if he has more than two, he shews them directly, which answers the same

fame purpofe. However, if a trick be played before any of the gamefters call, they lofe the benefit of *can you*, for that deal.

As to the value of the cards, the ace is the higheft, then the king, queen, knave, ten, nine, &c. in order: but the leaft trump will win the higheft card of any other fuit.

In playing, vigilance and judgment do a great deal; for though you have but low cards, yet by playing them fuitable to thofe in your partner's hand, fo that he may either trump them, or play the beft of that fuit on the board, you may contribute much to gain the game. For this purpofe, you ought to have a fpecial eye to what cards are played out, by which means you will know what to play, if you lead, or trump fecurely and advantageoufly.

HONOURARY, fomething done or conferred upon any one, to do him honour. See the article HONOUR.

Honourary is fometimes underftood of a perfon who bears or poffeffes fome poft or title, only for the name's fake, without doing any thing of the functions belonging to it, or receiving any advantage from it: thus we fay, honourary counfellors, honourary fellow, &c.

Honourary is alfo ufed for a lawyer's fee; or a falary given to public profeffors in any art or fcience.

HONOURARY SERVICES, in law, fuch fervices as relate to the tenure of grand ferjeantry, and ufually annexed to honours.

HONOURARY TUTOR, a perfon of quality, appointed to have an eye over the adminiftration of the affairs of a minor, while the onerary tutors have the real management of them.

HOOD, in falconry, a piece of leather, with which the head of a hawk, falcon, &c. is covered.

After a hawk is feeled, fhe fhould be fitted with a large eafy hood, which is to be taken off and put on very often, watching her two nights, and handling her frequently about the head: when you perceive that fhe has no averfion to the hood, unfeel her in an evening by candle-light, continuing to handle, hood, and unhood her as before, till at laft fhe takes no offence, but will patiently endure handling: after unfeeling, anoint with your finger and fpittle, the place where the feeling-thread was drawn through; then hood her, and hold her on your fift all night: as foon as fhe is well reclaimed, let her fit upon a perch, but every night keep her three or four hours on the fift; ftroking, hooding, and unhooding her. This may alfo be done in the day-time, as foon as fhe has learned to feed eagerly, and without fear.

HOOF, *ungula*, the horny fubftance that covers the feet of divers animals, as oxen, horfes, fheep, &c. See HORN.

A horfe's hoof fhould be of a round, not longifh figure; and its fubftance folid, tough, high, fmooth, without any circles, fomewhat fhining, and of a dark colour, for that which is white is commonly brittle; in fhort, it ought to be of the colour of the hoof of a deer, and the whole foot round, but a little larger below than above, upright, and fomewhat hollow on the infide, and fo difpofed that he may tread more on the toe than the heel.

The hoof of a horfe is either perfect or imperfect: an imperfect hoof is one that wants any of the above qualities; and, 1. May be broad and fpreading out at the fides and quarters; fuch a horfe has, for the moft part, narrow heels, and will foon be flat-hoofed; he will neither carry a fhoe long, nor travel far. 2. Others are rugged or brittle-hoofed, which is a fign that it is too hot and dry. Some are long, which caufes the horfe to tread all upon his heels, and by that means to breed wind-galls. 4. There are fome crooked hoofs, broad on the outfides and narrow within, by which means the horfe is fplay-footed. 5. Others have flat hoofs, and not hollow within, which give rife to the inconveniencies above fpecified in the firft fort of imperfect hoofs: but if it be too hollow, it will dry too faft, and make him hoof-bound. 6. When the frufh is broad, the heels will be weak and foft, and the horfe will never tread boldly on the ground. 7. Some have narrow heels; thefe are the tendereft of all, and the horfe will grow hoof-bound.

Bony HOOF, is a round bony fwelling, growing on the very top of a horfe's hoof, which is always caufed by fome blow or bruife.

The method of cure is, firft to digeft the fwelling, either with rotten litter, or hay boiled in ftale urine, or with a plafter of ftale wine-lees and wheat-flour boiled together, in order to ripen it, and bring it to fuppuration, or to diffolve the tumour. If it come to a head, lance it in the loweft part of the foftnefs, with a thin hot iron,

 to

to let out the matter; then tent it with turpentine, deer's ſuet, and wax, equal quantities of which ſhould be boiled together; and laying a plaſter of the ſame ſalve over it, to keep in the tent till it be thoroughly well.

HOOF *bound*, this diſorder is a ſhrinking of the hoof at the top and at the heel, which makes the ſkin ſtare above the hoof, and grow over it.

This diſorder may happen to a horſe, either by keeping him too dry in the ſtable, by ſtreight ſhoeing, or by ſome unnatural heat after foundering.

HOOF-BRITTLE, an infirmity in horſes, proceeding either naturally, from the ſire or dam; or accidentally, from a ſurfeit falling down into the feet; or from the horſe's being formerly foundered.

For the cure, take unwrought wax, turpentine, ſheep's ſuet, and hog's greaſe, of each four ounces; ſallad-oil, a quarter of a pint; and of dog's greaſe, half a pound: boil them all together, and, with this mixture, anoint the hoof well for two or three days, eſpecially at the ſetting on of the hair, and ſtop them with cow-dung and dog's greaſe, melted together.

HOOF-SWELLED, a diſorder that ſometimes happens by a prick, or a young horſe's being over-ridden, or too hard wrought, and which, if not ſpeedily removed, will beget a wet ſpavin.

For the cure, take the ſtrongeſt aqua fortis you can get, and firſt file or draw away the old hoof ſomewhat near, with a file or drawing-iron, then touch what is left of the hoof, three or four dreſſings or more, with the aqua fortis; and anoint the foot with an ointment made of one pound of hog's greaſe; patch greaſe, three quarter's of a pound; venice-turpentine, five ounces; new wax, three ounces; and ſallad oil, three ounces; all melted together over the fire: and by anointing the coffin of the foot quite up to the top, you will cauſe a new hoof to grow upon it.

HOOF LOOSENED, a dividing of the horn or coffin of the hoof from the fleſh, at the ſetting on of the coronet.

This diſorder cannot be properly cured without the aſſiſtance of the farrier.

HOOGSTRATEN, a town of the auſtrian Netherlands in the province of Brabant, 20 miles north-eaſt of Antwerp: eaſt long. 4° 45′, north lat. 51° 25′.

HOOK, a piece of iron or braſs-wire bent, and turned up at one end.

Hooks are a neceſſary ſort of utenſils, and being uſed for various purpoſes, are of ſeveral ſorts: thus, boat-hooks (ſee pl. CXXXV. fig. 1. n° 1.) are for ſetting off boats; can-hooks (*ibid.* n° 2.) are for hoiſting caſks into a ſhip: cant-hooks (n° 3.) are for turning or canting large maſts, having at one end a ring for a hand-ſpike to go through, and at the other a claw; laying-hooks (n° 4.) uſed by rope-makers, when laying of cordage; rave-hooks (n° 5.) uſed by caulkers for picking the old oakam out of the ſeams of ſhips; ſheer-hooks (n° 6.) let into or put on the main and fore-yard-arms of fire-ſhips, in order to faſten into an enemy's ſhrouds, ſails, or rigging. Beſides theſe there are draught-hooks, placed both behind and before the cheeks of a gun-carriage; fiſh-hooks of ſeveral ſizes, uſed for catching fiſh; and a large ſort in the ſame form, and called by the ſame name, uſed in ſhips for taking hold of the ſhank of the anchor, when it is to be hove up to the bow; gamming-hooks, uſed when gammoning the bowſprit; port-hooks, drove into the ſides of a ſhip, to hang the ports upon; puttock-hooks, for the plates to hook upon; tackle-hooks, ſpliced into the ſtraps of blocks, or ends of rope; pot-hooks, to hang kettles or pots over the fire; ſpinning hooks, uſed by rope-makers to hang their threads on, as they ſpin them; armour-hooks to lay arms upon, as guns, halberts, half-pikes, *&c.* chimney-hooks, to ſet the tongs, fire-ſhovel, *&c.* againſt; caſement-hooks, curtain-hooks, hooks for doors, gates, *&c.* double line-hooks, ſingle line-hooks, tenter-hooks, *&c.*

HOOK-PINS, are bolts made with a ſhoulder at one end, and uſed by carpenters in framing: theſe are drove through the mortices and tenants of the work, prepared for building or wharfing, *ibid.* n° 7.

HOOKER, in naval architecture, a veſſel much uſed by the Dutch, built like a pink, but rigged and maſted like a hoy. Hookers will lie nearer a wind than veſſels with croſs-ſails can do. They are from fifty to two hundred tons burden, and with a few hands will ſail to the Eaſt-Indies.

HOOPOE, *upupa*, in ornithology. See the article UPUPA.

HOP, *lupulus*, *humulus*, in botany, a genus of the dioecia-pentandria claſs of plants, neither the male nor female flower of which has any corolla; the cup of the male flower is compoſed of five leaves; that

that of the female is made up of only a fingle leaf, very large, and of an oval figure; the feed is fingle, roundifh, covered with a coat, and contained within the cup.

Mortimer reckons four kinds of hops: 1. The wild garlic-hop. 2. The long and fquare hop. 3. The long white. And, 4. the oval hop. The firft of thefe is not worth cultivating. The fecond is a good hop, but looking generally red towards the ftalk, it will not fetch fo good a price at the market. The long white hop is the moft beautiful of all, and produces the greateft quantity: this kind and the oval will grow very well together. They delight in a deep rich garden-mould; this may have fand among it, but never fhould have any clay: moory black land is what they are planted in, in Effex, but any light land will do. The hop fends its roots four or five yards deep, and for this reafon it thrives beft in that land where there is a good bottom below what is ufually ftirred, or manured, for agriculture. If the hop-land be wet, it muft be laid up in high ridges, and drained in winter, that the roots be not rotted or chilled.

New land is found to fucceed better with hops than old, and on this principle they are very cautious in their plantations in Kent, and look forward for the after-produce. When they make a new hop-ground, they plant it with apple-trees at a large diftance afunder, and with cherry-trees between; by this means when the hops have grown ten years, which they judge as much as they will do well, they place their account in the cherry-trees, which bear large crops; thefe they gather for about thirty years, and then they cut them up, and depend upon their apple-trees only, which they find very large and ftrong by that time.

The dry ftalks of hops fhould be burnt on the ground in winter, covering them with a little frefh earth as they burn. This makes together an excellent compoft, to make the hills of. The land muft be dug or plowed well, and laid very even, and then the places for the hills marked out by a line, and a ftick put in every place where one is to be. A thoufand hills may be made in an acre of ground, and fix or feven plants fet on every hill. From fix to nine feet fhould be allowed between every hill, and the grounds in the hills fhould be better and richer than the common earth. Some plant hops in March and April, but the moft experienced people prefer the month of October, becaufe they will then ftrike firm roots, and be ftrong and vigorous againft fpring. The largeft plants are to be chofen; and it is beft to procure them from fome rich ground, where the hills have been laid high; they fhould be about eight or ten inches long, and have three or four joints or buds a piece; the holes for planting them are to be dug eight or ten inches deep, and about a foot over, and in each of thefe holes four plants are to be fet, one in each corner: they may be covered an inch deep over the top, if planted in October; but in fpring, when they have fhot from the joints, then they muft not be buried: after this, the ground muft be carefully kept clear of weeds.

Dreffing of HOPS. This is preparing the ground in winter and fpring for the making a good fummer-crop. In doing this, the hills upon which the plants ftand muft be all pulled down, and undermined on every fide, till the fpade comes near the principal root; then fhake off or remove with the hand the loofe mould from the upper or loofe roots, that you may fee where the new roots grow out of the old fets. The old fets are to be carefully preferved, but the other roots may be cut away. Whatever time the hills are pulled down, the roots muft not be cut till March. When the young hops are dreffed for the firft time, all the roots are to be cut away that grew the year before, and the fets are to be cut off within one inch of the fame; and every year after, they muft be cut as clofe as may be to the old roots; but to a weak hop, fome of the fhoots are to be left at the dreffing. Thofe roots of the plant which grow downwards, are never to be injured, but only thofe which run horizontally are to be cut. The old roots and the young ones may be eafily diftinguifhed, in that the old ones are always red, and the young white. If there are by accident any wild hops got among the reft, the places where they grow are to be marked with fticks, or otherwife, at the time of their being gathered; and after this, at the time of dreffing the ground, that whole hill is to be deftroyed, and a new one made with new plants in the room of it. When the roots are cut and dreffed, the rich compoft is to be put to them; and the hills muft not be made too high at firft, left they hinder the young fhoots.

Gathering and drying of Hops. Hops blow in the latter end of July; in the beginning of Auguft they bell, and they are fometimes ripe at the beginning of September, fometimes later. When they begin to change colour, are eafily pulled to pieces, and their feeds look brown within them, they are ripe, and they are then to be gathered as quick as poffible, for the leaft blaft of wind will hurt them at this time.

The manner of gathering hops, is to take down four hills ftanding together in the midft of the garden, and to cut the roots even with the ground, then lay the ground level, and when it is fwept clean, it makes a floor, on which the hops may be laid and picked. The hop-plants are firft unwound from the poles, and then the people fit round and pick off the hops into bafkets.

Care fhould be taken to dry the hops as faft as they are picked, for in lying undried they are apt to heat and change colour very quickly. If the quantity picked be fo large that the kiln, in which they are to be dried, is over ftocked, they muft be fpread thin upon a floor, and they will keep two or three days in that manner, without any harm. Indeed, where the quantity is but fmall, there is no need to have recourfe to the kiln at all, for they will dry much better than any other way, by being laid thin upon a floor, and often turned. The drying of hops is the moft material part of their manufacture; for if they be ill dried, they loofe all their agreeable flavour; and great caution fhould be ufed, that they be all equally dried.

Bagging of Hops, a term ufed by the farmers, who cultivate hops, for the laft thing they have to do with them, in order to bring them to market; that is, the putting them up in large bags of coarfe cloth, for carriage. When the hops have been picked and dried in the oaft, or tin-floor, they are fo brittle that they would break to pieces and be fpoiled if they were immediately to be put up; they are therefore to lie together three weeks, or thereabouts, that they may become tough: if they are covered from the air by blankets in the heap, they may be bagged much fooner than if left open.

The manner of bagging them is this; a hole is made in an upper floor, fo large that a man may eafily go up and down it; then a hoop is fitted to the mouth of the bag, and fo firmly fewed on, that it cannot be torn off; the bag is then let down thro' the hole, and the hoop remaining above, ftops it from being pulled quite thro', being larger than the hole: a few hops are to be firft thrown into the bag, and a perfon below is to take up a parcel of thefe in each corner of the bag, tying it with a packthread, this makes a fort of taffel, by which the bags are afterwards the eafier managed and turned about. When this is done, one man muft go down into the bag, and, while another cafts in the hops, he muft tread them down equally every way with his feet; when the bag is in this manner filled, it is to be ripped from the hoop, and fewed up, leaving two taffels at the corners, as at the bottom. A bag of hops thus prepared, may be kept for feveral years in a dry place.

The tops of this plant, being of a cooling quality, are eaten, when boiled, as an emollient. A decoction of hop-flowers is alfo accounted an antidote againft poifon, and cures the itch, as well as the fyrup thereof, and is efteemed excellent in choleric and peftilential fevers. The heads and tendrils are good in the fcurvy and moft cutaneous difeafes. Juleps and apozems are alfo prepared with hops for hypochondriacal and hyfterical affections, and to promote the menfes: but the chief ufe of this plant confifts in preferving beer and other malt liquors (in which the flower of this plant is a principal ingredient) from turning four, and rendering it wholefome and grateful to the tafte, &c.

Hops, the hundred weight, pay, on importation, 5 l. 4 s. 6 d. and on exportation draw back 3 l. 9 s. 4½ d. but if exported to Ireland, there is no drawback.

HOPE, or *Cape of Good*-Hope. See the article Good-hope.

HOPLITES, in antiquity, an appellation given to fuch of the candidates at the olympic games, as ran races in armour.

HOPPER, a kind of bafket, wherein the feed-corn is carried at the time of fowing. See the article Sowing.

It is alfo ufed for the wooden trough, in a mill, into which the corn is put to be ground. See the article Mill.

HORARY, fomething relating to an hour. Hence

Horary, or Hour-circle *of a globe*, a fmall brazen circle, fixed upon the brazen meridian, divided into twenty-four hours,

hours, having an index moveable round the axis of the globe, which, upon turning the globe fifteen degrees, will ſhew what places have the ſun an hour before or after us: for inſtance, if the index of the hour-circle be ſet at the upper XII. when the globe is rectified for London, and the globe turned 15 degrees from eaſt to weſt, the index will point at the hour of I. which ſhews that all places under that meridian, and particularly Naples, have the ſun an hour ſooner than London has it: on the contrary, let the index be ſet at the upper XII. again, and the globe be turned 15 degrees from weſt to eaſt, the index will point at XI. becauſe all places under that meridian, particularly the Madeira-iſlands, have the ſun an hour after London has it. For the ſeveral problems performable on the globes, by means of the horary circle, ſee the article GLOBE.

HORARY CIRCLES, or LINES, in dialling, are the lines or circles which mark the hours on ſun-dials. See DIAL.

HORARY MOTION *of the earth*, the arch it deſcribes in the ſpace of an hour, which is nearly 15 degrees, though not accurately ſo, as the earth moves with different velocities, according to its greater or leſſer diſtance from the ſun. See EARTH.

HORD, in geography, is uſed for a company of wandering people, which have no ſettled habitation, but ſtroll about, dwelling in waggons, or under tents, to be ready to ſhift as ſoon as the herbage, fruit, and the preſent province is eaten bare: ſuch are ſeveral tribes of the Tartars, particularly thoſe who inhabit beyond the Wolga, in the kingdom of Aſtracan and Bulgaria.

A hord conſiſts of fifty or ſixty tents, ranged in a circle, leaving an open place in the middle. The inhabitants of each hord uſually form a military company or troop, the eldeſt whereof is commonly the captain, and depends on the general or prince of the whole nation.

HORDEOLUM, or CRITHE, in medicine, a tubercle in the upper part of the eye-lid near the eye-brows, like a grain of barley, whence it takes its name; but it is commonly called a ſtye. For the cure of an hordeolum, Allen orders it to be covered over with white wax, or anointed with hen's greaſe, or faſting ſpittle; or to rub it with the body of a fly, the head being thrown away; or with the blood of a dove or partridge. If all theſe prove ineffectual, it muſt be extirpated by cutting, or conſumed by a liquid cauſtic; after which, let the plaſter of the abbot de Grace be applied.

HORDEUM, BARLEY, in botany, a genus of the triandria-trigynia claſs of plants, the corolla whereof conſiſts of two valves; the inferior valve is angular, of an ovato-acuminated figure, bellied, and longer than the cup, and terminates in a very long ariſta; the anterior valve is lanceolated, plane and ſmaller; the corolla ſerves as a pericarpium, ſurrounding the ſeed, and not letting it out; the ſeed is oblong, ventricoſe, pointed at each end, and marked with a longitudinal furrow.

For the culture and great uſe of this plant, ſee the article BARLEY.

For the bounty on the exportation of barley, ſee CORN.

HORDICALIA, or HORDICIDIA, in antiquity, a religious feaſt held among the Romans, wherein they ſacrificed cattle big with young. This feaſt fell on April 15, on which day they ſacrificed thirty cows with calf, to the goddeſs Tellus, or the Earth: part of them were ſacrificed in the temple of Jupiter. The calves taken out of their bellies were burnt to aſhes at firſt by the pontifices, afterwards by the eldeſt of the veſtal virgins.

HOREHOUND, *marrubium*, in botany. See the article MARRUBIUM.

Baſe HOREHOUND, a name given by ſome to ſtachys. See the article STACHYS.

Water-HOREHOUND, *lycopus*, in botany. See the article LYCOPUS.

HORIZON, in aſtronomy and geography, that great circle which divides the heavens and the earth into two equal parts, or hemiſpheres, diſtinguiſhing the upper from the lower. See SPHERE.

The horizon is either ſenſible or rational.

The ſenſible horizon is that circle, which, being diſcovered by our ſenſes, limits our proſpect. See the article CIRCLE.

When we are on terra firma, this circle commonly ſeems rugged and irregular, occaſioned by the unevenneſs of the ground; but at ſea, there are no ſuch irregularities. The ſemi-diameter of this circle, varieth according to the height of the eye of the obſerver. If a man ſix feet high ſtood upon a large plain, or the ſurface of the ſea, he could not ſee above three miles round.

The rational or true horizon, is a great circle of the apparent celeſtial ſphere, dividing it into two equal hemiſpheres, and ſerving as the limits of elevation or depreſſion

preſſion of celeſtial objects. This horizon being parallel to the ſenſible horizon, is diſtant from it by the ſemi-diameter of the earth, through whoſe center it paſſes: for the aſtronomers reduce the appearances of the heavens to a ſpherical ſurface, which is not concentrical to the eye, but to the earth.

It divides the heaven and earth into two parts, the one light, and the other dark, which are greater or leſſer, according to the condition of the place, &c. It determines the riſing and ſetting of the ſun, moon, or ſtars, in any particular latitude; for when any of theſe appear juſt at the eaſtern part of the horizon, we ſay, it riſes; and when it does ſo at the weſtern part, we ſay, it ſets. And from hence alſo the altitude of the ſun or ſtars is accounted, which is their height above the horizon.

This circle is divided by aſtronomers into four quadrants, or cardinal points. See the article COMPASS.

The poles of this horizon are the zenith and the nadir: and the innumerable circles drawn through theſe poles to the horizon, are called the vertical circles, or azimuths. See the articles ZENITH, NADIR, and AZIMUTH.

Theſe two horizons produced to the fixed ſtars, will appear to coincide into one, ſince the earth, compared to the ſphere in which the fixed ſtars appear, is but a point; therefore the two circles, which are but a point diſtant from each other, may be well conſidered as coinciding into one.

HORIZON *of a globe*. See the article GLOBE.

HORIZONTAL, ſomething relating to the horizon; or that is taken in, or on a level with the horizon: thus we ſay, an horizontal plane, &c.

HORIZONTAL DIAL, that drawn on a plane parallel to the horizon, having its ſtyle elevated according to the altitude of the pole, in the place it is deſigned for. See the article DIAL.

HORIZONTAL DISTANCE. See the article DISTANCE.

HORIZONTAL LINE, in perſpective, a right line drawn through the principal point parallel to the horizon; or it is the interſection of the horizontal and perſpective planes. See the article PERSPECTIVE.

HORIZONTAL PARALLAX. See the article PARALLAX.

HORIZONTAL PLANE, that which is parallel to the horizon of the place, or nothing inclined thereto.

The buſineſs of levelling is to find whether two points be in the horizontal plane, or how much the deviation is.

HORIZONTAL PLANE, in perſpective, a plane parallel to the horizon paſſing thro' the eye, and cutting the perſpective plane at right angles.

HORIZONTAL PROJECTION. See the articles PROJECTION and MAP.

+HORIZONTAL RANGE, or LEVEL RANGE, *of a piece of ordnance*, is the line a ball deſcribes, when directed parallel to the horizon, or horizontal line.

The horizontal ranges are the ſhorteſt: ſome pieces of cannon will make them ſix hundred paces, and ſome but one hundred and fifty; and the ball with the range of ſix hundred paces, will go from nine to thirteen feet in the earth. See the article GUNNERY.

HORIZONTAL REFRACTION. See the article REFRACTION.

HORIZONTAL SHELTERS, among gardeners, are defences diſpoſed parallel to the horizon, for tender plants, bloſſoms, and fruits, in the ſpring, to defend them againſt blaſts and pinching nights.

Horizontal ſhelters, ſays Miller, have by ſome perſons been greatly recommended to preſerve fruit-trees, but with how little reaſon, or upon what ſlight experiments, every one that has ever made uſe of them will eaſily judge, eſpecially thoſe which are contrived by placing tiles in the walls, at certain diſtances; nothing being more obvious than that vegetables, when prevented from receiving the advantages of dews, rains, &c. theſe kindly benefits of heaven, grow weak, languid, and at laſt entirely decay: and from numbers of experiments, which have been lately made, we find that trees imbibe great quantities of nouriſhment through the pores of their leaves and branches, whereby they are rendered vigorous and healthy, even in ſuch ſeaſons, and upon ſuch ſoils, where one would think it impoſſible they ſhould receive much nouriſhment from the earth: to deprive them of this advantage, therefore, is no leſs than deſtroying them.

The only ſort of ſhelter Mr. Miller approves of, for fruit-trees, is that made with two leaves of ſlit-deal, joined over each other, and painted; theſe being fixed upon the top of the wall, with pullies, to draw up and down at pleaſure, form a

a sort of penthouse, which are let down in great rains, or cold nights, during the time that the trees are in flower, or the fruit is setting. But then, he observes, that these shelters should be removed away soon after the fruit is set, so that the trees may enjoy all the advantages of rain, dew, &c. in the summer, which are absolutely necessary to have healthy trees, or good fruit.

HORMINUM, CLARY, in botany, a genus of the didynamia-gymnospermia class of plants, reckoned by some a species of baum; the flower of which is monopetalous and ringent; the upper lip is hollow, and semibifid: the seeds are four in number, and contained in the cup. See plate CXXXV. fig. 2.

An infusion or decoction of clary, is esteemed good in the fluor albus, colic, flatulencies of all kinds, and hysteric complaints.

This plant is also said to be an antispasmodic, good against epilepsies, and in great esteem as a provocative to venery. It has also been commended as a vulnerary, and its juice is an ingredient in some ointments and plasters.

HORMINUM is a name also used for a species of sage. See the article SAGE.

HORN, *cornu*, in physiology, a hard substance growing on the heads of divers animals, particularly the cloven-footed quadrupeds; and serving them both as weapons of offence and defence.

The casting of the horns of deer is a singular phænomenon, the true reason of which seems to be a stoppage of the circulation; so that being deprived of the nourishing juice, they fall off much in the same manner as the leaves of trees do in autumn. About ten days after the horns are cast, the new ones begin to appear: these at first are soft and hairy, but they afterwards grow hard, and the creature rubs off the hair.

Horns make an article of commerce. Those of oxen or cows, imported, pay a duty of 1 s. $7\frac{15}{100}$d. per hundred, and draw back on exportation, 1 s. $5\frac{25}{100}$d. Those of harts or stags, pay on importation 5 s. $9\frac{75}{100}$d. per hundred, and draw back 5 s. $1\frac{20}{100}$d.

HORN is also a musical instrument of the wind-kind, chiefly used in hunting, to animate the hunters and the dogs, and to call the latter together.

The french horn is bent into a circle, and goes two or three times round, growing gradually bigger and wider towards the end, which in some horns is nine or ten inches over.

HORN, in architecture, sometimes denotes a volute. See the article VOLUTE.

To give a stroke with the HORN, among farriers, is to bleed a horse in the roof of the mouth with the tip of a stag's horn.

HORN *of plenty*. See CORNUCOPIA.

HORNS *of insects*, the slender oblong bodies projected from the heads of those animals, and otherwise called antennæ, or feelers.

The horns of insects are extremely various; some being forked, others plumose or feathered, cylindrical, tapering, articulated, &c.

As to the use of these parts, some have imagined they served to wipe and defend the eyes; others, that they served as feelers, lest the creature should run against any thing that might hurt it; and others there are, who think them the organs of smelling.

HORN-BEAM, *carpinus*, in botany. See the article CARPINUS.

HORN-COOT, a name sometimes given to the great horn owl. See BUBO.

HORN-FISH, a species of acus, otherwise called gar-fish. See the article ACUS.

HORN-WORK, in fortification, an out-work composed of two demi-bastions, joined by a curtin. See plate CXXXIII. fig. 4.

Its construction is very simple. From C the angle of the half-moon, they lay off eighty-eight fathoms to D; and on the center C, with the radius C D, describe the arch F D G, on which laying off D F D G each equal sixty fathoms, and drawing F G, this will be the exterior side of a polygon, whereon the two demi-bastions may be described in the usual way.

The parapet of the horn-work is the same with that of the half-moon, and its moat is $\frac{3}{4}$ of the great moat. Its curtin is usually defended by an half-moon, whose moat is $\frac{3}{4}$ of that of the great half-moon, before the curtin of the place.

According to Vauban, none of the out-works is equal in strength to the horn-work, if placed before the bastion, and not as usual before the curtin.

HORN-GELD, a tax paid for feeding of horned beasts in the forest. See FOREST.

HORNET, *crabro*, in zoology, a species of apis with a black thorax, and double black spots on the segments of the body. See the article APIS.

HORNET-FLY, a two-winged fly, so called from its resemblance to the hornet.

HORNSEY, a market-town of the east riding

riding of Yorkshire, 35 miles east of York.

HOROGRAPHY, the same with dialling. See the article DIALLING.

HOROLOGIUM, a general name for instruments to measure the hours, as a watch, clock, dial, &c. See the articles WATCH, CLOCK, &c.

HOROPTER, in optics, a right line A B (plate CXXXIII. fig. 2.) drawn through the point C, where the two optic axes, H C and I C, meet, parallel to the line H I which joins the centers of the two eyes, H and I.

It is called horopter, as limiting the bounds of distinct vision. See VISION.

HOROSCOPE, in astrology, is the degree of the ascendant, or the star that rises above the horizon at a certain moment, which is observed in order to predict some future event, as the success of a design, the fortune of a person who was at that instant born, &c.

The same name is also given to a scheme or figure containing the twelve houses, in which are marked the situation of the heavens and stars, in order to form predictions. See HOUSE.

Lunar HOROSCOPE, the point from whence the moon proceeds when the sun is in the ascending point of the east.

HORSE, *equus*, in zoology, a well known quadruped, of the order of the Jumenta, the characters of which are these: the fore-teeth are six in number, the upper ones incurvated, and the inferior prominent: the canine teeth are not exerted, and are on each side separated by a space from the teeth: the hoof is undivided, and the teats are two, and placed in the groin.

The horse is one of the noblest quadrupeds we are acquainted with. In strength and natural fierceness, he is inferior to few, and yet easily tamed. The head is long, and large; the eyes large, and prominent; the ears erect, and beautiful; the neck is long and thick, and elegantly decorated with a mane; the body is rounded, and beautifully turned; the legs are strong, without being bulky; and the tail is long, and hairy all the way; the hairs being like those of the mane, only longer, thicker, and more beautiful.

Foreign horses or mares on their being landed in this kingdom, pay a duty of 1 l. 18 s. 6 d. and on their exportation, a draw-back is allowed of 1 l. 13 s. 9 d. But british horses, mares, and geldings, on their exportation, pay only 5 s. each.

Stone-HORSE, or STALLION. See the article STALLION.

Master of the HORSE. See MASTER.

Hunting-HORSE, ought to have a large, lean and long head, open ears, small, and standing upright; a forehead long, broad, and rising in the middle, like that of a hare; his eyes should be full, large, and bright; his nostrils wide and red within; his mouth large, deep in the wikes, and hairy; his thropple or windpipe large, loose, and straight when he is reined in with the bridle; his head should be set on his neck in such a manner, that a space may be felt between his neck and his choul; his crest should be firm, thin, and well raised; his neck long and straight, yet not loose and pliant; his breast strong and broad; his chest deep; his chine short; his body large; his ribs round like a barrel, his belly being hid within them; his fillets large; his buttocks rather oval than broad; his cambrels upright, and not bending; his legs clean, flat and straight; his joints short, well knit, and upright, especially betwixt the pasterns and the hoof, and with but little hair on his fetlocks; his hoofs black, strong, and hollow, and rather long and narrow, than big and flat; and his mane and tail long, and rather thin than thick.

As to marks or colours, some do not scruple to affirm, that wherever a horse is met with that has no white about him, especially in his forehead, tho' he be otherwise of the best reputed colours, as bay, black, sorrel, he is of a dogged disposition, especially if he has a small pink eye, a narrow face, and a nose bending like a hawk's bill.

HORSE-RACING, a diversion more used in England than in all the world beside. Horses for this use should be as light as possible, large, long, and well shaped, nervous, of great mettle, and good wind, with small legs, and neat small shaped feet.

The rider ought to place himself on the horse with his knees firm, and his stirrups just at such a length, that when his feet are thrust home in them, he can raise himself a little in his saddle; for without that allowance, his legs will not be firm when he comes to run; the counterpoise of his body must be forward, to facilitate the horse's running, and his elbows close to his body; he must not sway to this side or that, but must take great care of his seat and hand; he should also take care not to hold himself by the bridle,

bridle, and not to twitch it back upon any occasion.

A plate being to be run for, every man that rides must be the just weight both at starting and at the end of the same heat: for if any one wants weight at coming in, he loses the heat, even tho' he came in first horse. Half an hour is allowed between every heat to rub down the horses, and at the warning of the drum and trumpet, the jockeys are to mount. If the same horse wins two heats running, or two heats out of three, he wins the plate; but if three heats are won by three different horses, a fourth is run, when he that wins two of the heats gains the plate. In these races, where there are more heats than one, it is sometimes a piece of policy in a rider to lose a heat, and for the ease of the horse to lie behind all the way, as much as he can, provided he brings him in within the distance-post: but when there is only a single heat to be run, he must push for all at that one time.

Horse-races are to be begun and ended the same day, and no plate, except the king's plates, shall be run for, that is under 50 l. value, on the penalty of 200 l. It is also ordained, that only one horse shall be entered by one person for the same plate, and if any person enters more, all the others will be forfeited. 13 Geo. II. c. 19.

Backing a HORSE, the breaking him to the saddle, or the bringing him to endure a rider.

When this is done, which should be on some light plowed grounds, care must be taken that all the tackling be good and firm, and every thing in its due and proper place; then a person is to hold his head, and another to mount him; but this must not be done suddenly, or at a jerk, but very gradually and slowly, by several half risings and heavings. If he bears this patiently, the person is to seat himself firmly on his back; but if he be troublesome, and not tamed enough, the person is to forbear the attempt to mount, and he is to be trotted hard in the hand over the said plowed lands again, till he is willing to receive the rider quietly on his back. When this is done, the person who is on his back must cherish him, and the man who has his head must lead him a few paces forward; then he is to be cherished again. The feet are to be fitted well in the stirrups, and the toes turned out; afterwards the rider is to shrink and move himself in the saddle, and the person who holds his head, is to withdraw his hand a little farther from the mouth. As the rider moves his toes forward, the holder must move him forward with the rein, till he is made to apprehend the rider's motion of body and foot, which must always go together, and with spirit, and will go forward without the other's assistance, and stay upon the restraint of the rider's hands. When this is accomplished, let him be cherished, and have grass and bread to eat; and then let the rider mount and alight several times, cherishing him between each time; and thus he is to be managed till he will go on, or stand still at pleasure. This being done, the long rein may be laid aside, and the band about the neck, which are always used on this occasion, and nothing will be necessary but the trenches and caveson, with the martingal. A groom must lead the way before; or another horse going only straight forwards, and making him stand still when desired. In this manner, by sometimes following, and sometimes going before another horse on the trot, the creature will by degrees be brought to know that it is his business to be quiet and governable.

HORSE-SHOES, plates of iron used for the defence of horses-feet. These are of several sorts.

1. That called the planch-shoe, or pancelet. This shoe is exceeding good for a weak foot, as it keeps it from stones and gravel, and will last longer than any shoe: but it is said to make a good foot and bad leg, because it causes the foot to grow beyond the measure of the leg.

2. Shoes with calkins. These are intended to keep the horse from sliding; but however they do him more harm than good, because they prevent his treading even on the ground, by which means he is in danger of straining his foot, especially in stony places. Some indeed do not think a horse well shod, unless all his shoes be made with calkins, either single or double; the double ones are however less hurtful; for he will tread evener with them than with those that are single; but then they must neither be too long nor sharp-pointed, but rather short and flat.

3. Shoes with rings. These were invented to make a horse lift his feet high, and were designed for horses that have tender hoofs; but what was intended for a remedy

a remedy, is highly prejudicial; for by adding either calkins or these rings to his shoes, his heels are made weaker than they were before.

4. Shoes with swelling welts, or borders round them. These being higher than the heads of the nails, save them from wearing; and, if made of well-tempered iron, are both the best and most lasting shoes.

5. Some in passing mountains, where smiths are not easy to be met with, carry shoes about them, with vices to fasten them to the horse's hoofs, without the help of hammer or nail: but tho' this sort of shoe may save the horse's feet from stones, yet they pinch his hoof, and perhaps do him more injury than the stones themselves would do. On such occasions it is better to make use of the following shoe.

6. The joint-shoe is made of two pieces, with a flat rivet-nail joining them together at the toe, so that it may be made both wide or narrow, to serve any foot.

7. The patten-shoe; this is used for a horse that is burnt in the hip, stifle or shoulder; as it causes him to bear upon that leg the grief is on, and consequently makes him use it the better.

8. The panton or pantable-shoe, which opens the heels, and helps hoof-binding. To which may be added the half panton-shoe, and the shoe proper for flat feet.

Horse-shoe, in fortification, is a small work sometimes of a round and sometimes of an oval figure, inclosed with a parapet, sometimes raised in the moat or ditch, or in low grounds, and sometimes to cover a gate, or to serve as a lodgment for soldiers.

Horse-shoe-head, a disease in infants, in which the sutures of the skull lie too open.

This is commonly a sign of a weak constitution, and a short life. The nurses usually embrocate the parts affected with brandy or rum, to which some add the white of an egg, or palm-oil.

Horse, in a military sense, the same with cavalry. See the article Cavalry.

The light horse, in an army, are all the regiments of horse, except the guards.

Horse, in a ship, is a rope made fast to each yard-arm, and on which the men stand to furl the sails. It is also a wooden frame with a rowel fixed in it, made use of by the riggers to woold ships-masts.

HORSHAM, a market-town and borough of Sussex, situated twenty-miles north-west of Lewes, in west longitude 21', north latitude 51° 10'. It sends two members to parliament.

Horsham-stone, a greyish kind of slate, formerly used to cover houses, so called because brought from Horsham.

HORTAGILERS, in the grand seignior's court, upholsterers, or tapistery-hangers. The grand seignior has constantly four hundred hortagilers in his retinue when he is in the camp: these go always a day's journey before him, to fix upon a proper place for his tent, which they prepare first; and afterwards those of the officers, according to their rank.

HORTICULTURE, the same with gardening. See Garden and Gardening.

HORTULANUS, in ornithology, a bird otherwise called emberiza flava, or the yellow-hammer. See Emberiza and Yellow-hammer.

HORTUS SICCUS, a dry-garden, an appellation given to a collection of specimens of plants, carefully dried and preserved.

The value of such a collection is very evident, since a thousand minutiæ may be preserved in the well-dried specimens of plants, which the most accurate engraver would have omitted. We shall, therefore, give two methods of drying and preserving an hortus siccus; the first by Sir Robert Southwell, in Phil. Transf. nº 237, and the other by Dr. Hill, in his review of the works of the royal society, with the doctor's objections to Sir Robert's method.

According to the former gentleman, the plants are to be laid flat between papers, and then put between two smooth plates of iron, screwed together at the corners, and in this condition committed to a baker's oven for two hours. When taken out, they are to be rubbed over with a mixture of equal parts of aquafortis and brandy; and, after this, to be fastened down on paper, with a solution of the quantity of a walnut of gum tragacanth dissolved in a pint of water.

To this the doctor objects, that the heat of an oven is much too uncertain to be employed in too nice an operation; and that the space of time, ordered for the continuing the plants in it, is of no information, unless the degree of heat, and even the different nature of the plant, as to its more or less succulency, and the firmness

firmnefs or tendernefs of its fibres, be attended to. There are fcarce any two plants perfectly alike in thofe particulars; and confequently the heat, and duration of heat, that is fufficient for one plant in a parcel, would deftroy another. But befides this, he objects farther, that the acid deftroys the colour of many plants, never recovers that of others loft in the drying, and frequently, after the plant is fixed down, rots both the paper it is fixed to, and that which falls over it.

As to the doctor's own method, it is as follows: take of a fpecimen of a plant in flower, and with it one of its bottom leaves, if it have any; bruife the ftalk, if too rigid; flit it, if too thick; fpread out the leaves and flowers on paper; cover the whole with more paper, and lay a weight over all. At the end of eighteen hours take out the plants, now perfectly flatted; lay them on a bed of dry common fand; fift over them more dry fand, to the depth of two inches, and thus let them lie about three weeks: the lefs fucculent dry much fooner, but they take no harm afterwards. If the floor of a garret be covered, in fpring, with fand two inches deep, leaving fpace for walking to the feveral parts, it will receive the collection of a whole fummer, the covering of fand being fifted over every parcel, as laid in. They need no farther care, from the time of laying them, till they are taken up to be ftuck on paper. The cement ufed by the doctor is thus prepared: early in the fpring, put two ounces of camphor into three quarts of water in a large bottle; fhake it from time to time; and when the firft collected plants are ready for the faftening down, put into a pint of the water, poured off into an earthen veffel that will bear the fire, two ounces of common glue, fuch as is ufed by the carpenters, and the fame quantity of ichthyocolla beat to fhreds; let them ftand fix and thirty hours, then gently boil the whole a few moments, and ftrain it off through a coarfe cloth. This is to be warmed over a gentle heat, when it is to be ufed, and the back of the plants fmeered over thereby with a painter's brufh: after this lay them on paper, and gently prefs them for a few minutes; then expofe them to the air a little, and finally lay them under a fmall weight between quires of paper to be perfectly dried.

It is fcarce to be conceived, how ftrongly the water becomes impregnated with the camphor by this fimple procefs: a part of it, indeed, flies off in the making of the cement and the ufing of it; but enough remains with the plant to prevent the breeding of infects in it. He farther obferves, that plants may be dried very well without fand, by only putting them frequently into frefh quires of paper, or a few, by only preffing them between the leaves of a book; but the fand method preferves the colour beft, and is done with leaft trouble.

Another method, much better than that of the oven is the flattening and drying the plant, by paffing a common fmoothing-iron for linen, over the papers between which it is laid: but for nice things, the moft perfect of all methods is that by a common fand-heat, fuch as is ufed for chemical purpofes. The cold fand is to be fpread fmooth on this occafion, the plant laid on it carefully flatted, and a thick bed of fand fifted over: the fire is then to be made, and the whole procefs carefully watched, till by a very gentle heat the plant be perfectly dried. The colour of the tendereft herb may be preferved in this manner; and flowers that can be preferved no way elfe, may be managed perfectly well thus.

HOSANNA, a hebrew word, fignifying *fave now*, or *fave we befeech thee*; from the frequent ufe of which, during the feaft of tabernacles, the whole folemnity got the appellation of *hofanna rabba*.

HOSE, in commerce. See STOCKING.

HOSEA, a canonical book of the Old Teftament, fo called from the prophet of that name, its author, who was the fon of Beri, and the firft of the leffer prophets. He lived in the kingdom of Samaria, and delivered his prophecies under the reign of Jeroboam II. and his fucceffors, kings of Ifrael, and under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. His principal defign is to publifh the grofs idolatries of the people of Ifrael and Judah, to denounce the divine vengeance againft them, and to foretel the captivity in Affyria.

HOSPITAL, a place or building properly endowed, or otherwife fupported by charitable contributions, for the reception and fupport of the poor, aged, infirm, fick, or helplefs.

A charitable foundation laid thus for the fuftenance and relief of the poor, is to continue for ever. Any perfon feized of an eftate in fee, may, by deed inrolled in

in chancery, erect and found an hospital, and nominate such heads and governors therein as he shall think fit; and this charitable foundation shall be incorporated, and subject to the inspection and guidance of the heads and visitors nominated by the founder. Likewise such corporations shall have, take, and purchase lands, so as not to exceed 200l. a year, provided the same be not held of the king; and to make leases, reserving the accustomed yearly rent.

Besides a multitude of alms-houses, or small hospitals, founded in England, particularly in and about London, by private men for the relief of the poor, there are a great many hospitals: the principal whereof are the,

Royal HOSPITAL for disabled soldiers, commonly called Chelsea-hospital.

This hospital was founded by king Charles II. carried on by king James II. and finished by king William and queen Mary. The building is very spacious and magnificent; the number of ordinary pensioners is about 500, besides the officers and servants of the house: the out and extraordinary pensioners are very numerous; and these upon occasion do duty in the several garrisons, from whence draughts are made for the army, *&c.* The pensioners are all provided with cloaths, diet, washing, lodging, firing, and have one day's pay in every week for spending-money. The qualifications required to be admitted of this body, are, that the candidate bring a certificate from his superior officer that he has been maimed and disabled in the service of the crown; or that he has served the crown twenty years, which must be made appear by the muster-rolls. To defray the charges of this hospital, there is a considerable sum paid yearly out of the poundage of the army; besides one day's pay of each officer and common soldier every year, which in time of war amounts to a very considerable sum. For the administration of this hospital, there is a governor, lieutenant-governor, major, treasurer, *&c.*

Greenwich-HOSPITAL, a retreat for seamen, who, by age, wounds, or other accidents, are disabled from services; and for the widows and children of such as are slain in the service.

This in point of magnificence and spaciousness, greatly excels even Chelsea-hospital. A good part of it was built in king Charles II's time. It was much promoted by king William, and finished under queen Anne, king George I. and II. The number of pensioners entertained in this hospital, are about 1200; and to each hundred are allowed five nurses, being the widows of seamen. The pensioners are all cloathed in blue, and are allowed stockings, shoes, linen, and twelve-pence a week for other necessaries: the victualling is according to the allowance of Chelsea-hospital, *viz.* four men to a mess, each mess to contain four pounds of flesh, a gallon of beer, *&c.* There are 100 boys, the sons of disabled seamen, who are maintained with the money arising by shewing the hospital and painting in the hall.

This hospital is administered by a governor, lieutenant-governor, *&c.*

Christ's HOSPITAL, by Newgate-street, formerly a convent of grey friars, being dissolved by king Henry VIII. was converted by his son Edward VI. into an hospital for poor children, called the blue-coat hospital, from the blue cloathing of the children, whose number amounts to about 900; the greatest part maintained in the house, and the others at nurse, at the charge of the foundation. The boys are yearly put to trades, and the girls to some honest service or trade. Here the boys have a grammar-school, from which the most improved scholars are yearly sent to the university: there is here also a stately writing school, and a mathematical school, founded by king Charles II. where forty youths are taught several parts of the practical mathematics, particularly navigation, to fit them for apprentices to masters of ships.

The officers of this hospital are a president, treasurers, governors, *&c.*

St. Bartholomew's HOSPITAL, at a small distance from Christ's hospital, did formerly belong to the same grey friars, but after the dissolution of the monasteries, king Henry VIII. left 500 marks a year to it for the relief of poor people: but it was much more largely endowed for the use of sick and lame persons only, by Edward VI. There are two other hospitals at the charge of this; one in Kingsland, and the other, called the Lock, in Southwark, for the venereal disease only. It is computed that these three hospitals relieve five thousand poor sick and lame persons annually, six or seven hundred of which are in-patients at St. Bartholomew. This hospital is a large, sumptuous, new building of stone, erect-

ed with proper offices in the nature of a quadrangle. It is provided with able phyficians and furgeons, *&c.* For the direction of it there is a prefident, treafurer, *&c.*

Bethlehem, or *bedlam* HOSPITAL, a ftately hofpital in Moorfields, for the cure and maintenance of poor lunatics, or diftracted perfons. This hofpital, for elegance of ftructure and fpacious conveniencies, is not to be equalled in Europe. It ftands alfo in a good open air.

St. Thomas's HOSPITAL, in Southwark, is upon the fame fcheme and nature with St. Bartholomew. It is a noble extenfive charity, was founded by king Edward VI. and rebuilt in 1701.

Guy's HOSPITAL, near St. Thomas's, was founded at the fole coft of Thomas Guy, bookfeller of London, in 1722, who left 200,000l. to build, finifh, and endow it. It was defigned chiefly for incurables.

Sutton's HOSPITAL. See CHARTREUSE.

Bridewell HOSPITAL. See BRIDEWELL.

At Hoxton there is another hofpital, founded by alderman Afke, for twenty poor old men of the haberdafher's company, and twenty poor boys to be there educated.

There are alfo two very beneficial charities or hofpitals, one at Hydepark-corner, and the other in Petty-france, Weftminfter, after the manner of thofe in London, and both very well attended.

In 1739, a long wifhed-for charity was eftablifhed by charter for taking in and educating poor deferted young infants. The governors and guardians have purchafed of the earl of Salifbury fifty acres of land in Lamb's conduit-fields, on which they have erected a large building for this charitable purpofe, called the foundling hofpital.

About the year 1741, an infirmary or hofpital in Goodman's fields was begun by charitable donations, for the relief of difabled poor feamen in the merchant fervice; and now a large ftately building for this charitable undertaking is erected near White-chapel-mount.

For feveral other charities of a like nature, tho' lefs confiderable, in and about London, fee the article *Work*-HOUSE.

Camp-HOSPITALS, are either general or regimental. The general hofpitals are of two kinds, *viz.* the flying hofpital, attending the camp at fome convenient diftance, and the ftationary hofpital, which is fixed at one place. In the choice of both, Dr. Pringle thinks it better to have them in towns than villages, as the former will afford larger wards, befides more of other conveniencies. Thefe wards fhould be as airy as poffible. Regimental hofpitals are of the greateft importance, and therefore fhould be fupplied with blankets and medicines from the public ftores, with an allowance alfo for nurfes and other neceffaries. Barns, ftables, granaries, and other out-houfes, but above all churches make the beft hofpitals from the beginning of June to October.

HOSPITAL FEVER, a name given to the malignant catarrhal fever, as being frequent in hofpitals. See the article FEVER.

This fort of fever, according to Dr. Pringle, may be owing to a great many concurring caufes, but the principal are foul and putrid air, occafioned by filth and impurity of any kind. Hence it is no wonder that it prevails in marfhy countries, after hot feafons, and in populous cities, efpecially if low and ill aired, unprovided with common fhores; or where the ftreets are narrow and foul, and the houfes dirty; water fcarce; and when jails and hofpitals are crowded, and not ventilated, and kept clean; when in fickly times the burials are within the towns, and the bodies not laid deep; when flaughter-houfes are alfo within the walls, or when dead animals or offals are left to rot in kennels, or on dunghils; when drains are not provided to carry off any large quantity of ftagnating and corrupted water in the neighbourhood; when flefh meat make the greateft part of the diet, without a proper mixture of bread, greens, wine, or other fermented liquors; from the ufe of old mufty grain, or what has been damaged by a wet feafon; or, laftly, when the fibres are relaxed by immoderate warm bathing.

When the difeafe comes on flowly, the fymptoms are fmall interchanges of heats and colds, trembling of the hands, interrupted fleep, *&c.* but when it advances faft, the above fymptoms are in a higher degree; and befides thefe the patient is afflicted with a great laffitude, a naufea, pains in the back, a conftant pain and confufion in the head, a dejection of fpirits, *&c.* The method of cure varies according to the ftate of the difeafe, which may be diftinguifhed into three periods: the firft continuing as long as the

the person is able to go about; the second beginning with his confinement; and the third, when the pulse sinks, and the stupor comes on.

In the first as well as the other period, the cure is principally to be aimed at by removing the patient out of the foul air. When this cannot be done, the ward or room should be purified by making a succession of air by means of fires, or letting it in by doors and windows, or diffusing the steams of vinegar. The next thing to be done is to promote a diaphoresis, which in this period should only be attempted by mild sudorifics, as the spiritus mindereri.

When the fever is confirmed, contrayerva powders, with nitre, camphor, the common ptisan acidulated, and such medicines as are good in inflammatory cases, ought to be given. Costiveness is prevented by emollient clysters. But opiates are dangerous both in this and the third stage, in which the pulse sinks, and stupor is greater, a delirium impends, and the petechiæ often appear. When this is observed to be the case, the nitre and diaphoretic medicines are to make room for a decoction of snake-root, to which a small quantity of strong water may be added. It may also be given in substance from two to four scruples a day, with sensible good effects. Towards the decline of the fever, an equal quantity of peruvian bark may be joined with the root. Wine is also an excellent cordial at this period, and may be given either made into whey, or added to the panado; being the only food proper for the patient. It may be taken from half a pint to a quart a day, according to the strength of the patient. Perhaps their is no rule of more importance than to give a strict charge to the attendants of the sick never to let the patient, when low, remain above two or three hours without taking something cordial and nourishing. If there be danger of a phrenitis coming on, it will be proper to call in the assistance of epispastics. Sinapisms too may be useful when the pulse is very much sunk. If a diarrhœa comes on in the decline of the fever, it is to be moderated by adding a few drops of the tinctura thebaica, to the full quantity of the alexipharmic decoction; or by giving a spoonful or two of an astringent mixture. In proportion, however, to the putrid nature of the stools, astringents are to be used with the greatest caution. When the fever is over, there are few but complain of a vertigo and want of rest; a continuation of the deafness and other nervous symptoms, are frequently the consequence of great lowness, in which case the pilulæ Mathæi are to be given at night, with analeptics, and medicines of the strengthening kind.

HOSPITALERS, an order of religious knights, now known by the title of knights of Malta. See MALTA.

HOSPITIUM, a term used in old writers either for an inn or a monastery, built for the reception of strangers and travellers. See INN and MONASTERY.

HOSPODAR, a title borne by the princes of Walachia and Moldavia, who receive the investure of their principalities from the grand seignior. He gives them a vest and standard: they are under his protection, and obliged to serve him, and he even sometimes deposes them; but in other respects they are absolute sovereigns within their own dominions.

HOST, *hospes*, denotes either a person who entertains another, or the person so entertained; but it is now generally used in the first of these senses.

HOST, or HOAST, *hostia*, in the church of Rome, a name given to the elements used in the eucharist, or rather to the consecrated wafer; which they pretend to offer up every day, a new host or sacrifice, for the sins of mankind.

They pay adoration to the host, upon a false presumption, that the elements are no longer bread and wine, but transubstantiated into the real body and blood of Christ. See TRANSUBSTANTIATION.

HOSTAGE, a person given up to an enemy as a security for the performance of the articles of a treaty.

When two enemies enter into a treaty or capitulation, it is common for them mutually to give hostages as a security for their reciprocally performing the engagements they have entered into. An hostage becomes either an accessary or principal, according to the state of things. Thus, for example, he is an accessary, when a prince promises fidelity to another prince, and gives either his son, or some great lord, as a security for his performing his promise without any farther stipulation: for then these hostages are only an additional engagement of the prince; and if he violate his word, they are not in any manner responsible for it. An hostage becomes a principal, when it is stipulated

ſtipulated that he ſhall be anſwerable for the event of things. For example, if a city promiſes to ſurrender within a certain time, in caſe it is not ſuccoured, and for the ſecurity of this article gives hoſtages, theſe hoſtages are of the ſame nature as bail given to a creditor to ſecure a debt; ſo that if the ſuccour arrives within the time, the promiſe becoming void, the hoſtages are diſcharged, and cannot be detained, juſt as the bail is diſcharged, if the original debtor pays the creditor; but if the ſuccours do not arrive, and the city is guilty of a breach of faith, by refuſing to ſurrender, then the hoſtages become principal, and may be puniſhed for the breach of faith; juſt as a bail becomes the principal debtor, on the other debtor's becoming inſolvent.

An hoſtage given for another perſon is free in caſe that other perſon dies. According to the law of nations, hoſtages ought not to be put to death, unleſs they themſelves have been guilty of ſome particular crime.

HOSTILITY denotes a ſtate of war or enmity between two nations.

During a truce all acts of hoſtility are to ceaſe on both ſides.

HOT, a relative term, importing the contrary of cold. See HEAT and COLD.

HOT-BATH. See the article BATH.

HOT-BEDS, in gardening, beds made with freſh horſe-dung, or tanner's bark, and covered with glaſſes to defend them from cold winds.

By the ſkilful management of hot-beds, we may imitate the temperature of warmer climates; by which means, the ſeeds of plants brought from any of the countries within the torrid zone, may be made to flouriſh even under the poles.

The hot-beds commonly uſed in kitchen-gardens, are made with new horſe-dung mixed with the litter of a ſtable, and a few ſea-coal-aſhes, which laſt are of ſervice in continuing the heat of the dung. This ſhould remain ſix or ſeven days in a heap, and being then turned over, and the parts mixed well together, it ſhould be again caſt into a heap, where it may continue five or ſix days longer, by which time it will have acquired a due heat. Theſe hot-beds are made in the following manner: in ſome ſheltered part of the garden, dig out a trench of a length and width proportionable to the frames you intend it for; and if the ground be dry, about a foot or a foot and a half deep; but if it be wet, not above ſix inches: then wheel the dung into the opening, obſerving to ſtir every part of it with a fork, and to lay it exactly even and ſmooth on every part of the bed, laying the bottom part of the heap, which is commonly free from litter, upon the ſurface of the bed: and if it be deſigned for a bed to plant out cucumbers to remain for good, you muſt make a hole in the middle of the place deſigned for each light about ten inches over, and ſix deep, which ſhould be filled with good freſh earth, thruſting in a ſtick to ſhew the places where the holes are; then cover the bed all over with the earth that was taken out of the trench, about four inches thick, and put on the frame, letting it remain till the earth be warm, which commonly happens in three or four days after the bed is made, and then the plants may be placed in it. But if your hot-bed be deſigned for other plants, there need be no holes made in the dung; but after having ſmoothed the ſurface with a ſpade, you ſhould cover the dung about three or four inches thick with good earth, putting on the frames and glaſſes, as before. In making theſe beds, care muſt be taken to ſettle the dung cloſe with a fork; and if it be pretty full of long litter, it ſhould be trod down equally on every part. During the firſt week or ten days after the bed is made, you ſhould cover the glaſſes but ſlightly in the night, and in the day time carefully raiſe them, to let out the ſteam; but as the heat abates, the covering ſhould be increaſed, and as the bed grows cold, new hot dung ſhould be added round the ſides of it.

The hot-bed made with tanner's bark, is, however, much preferable to that deſcribed above, eſpecially for all tender exotic plants and fruits, which require an even degree of warmth to be continued for ſeveral months, which cannot be effected with horſe dung. The manner of making them is as follows: dig a trench about three feet deep, if the ground be dry; but if wet, it muſt not be above a foot deep at moſt, and muſt be raiſed two feet above the ground. The length muſt be proportioned to the frames intended to cover it, but it ſhould never be leſs than ten or twelve feet, and the width not leſs than ſix. The trench ſhould be bricked up round the ſides to the above-mentioned height of three feet, and filled in the ſpring with freſh tanner's bark that has been lately drawn out of their vats, and has lain in a round heap, for

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the moiſture to drain out of it, only three of four days: as it is put in, gently beat it down equally with a dung-fork; but it muſt not be trodden, which would prevent its heating, by ſettling it too cloſe: then put on the frame, covering it with glaſſes; and in about ten days or a fortnight, it will begin to heat; at which time plunge your pot of plants or ſeeds into it, obſerving not to tread down the bark in doing it. Theſe beds will continue three or four months in a good temper of heat; and if you ſtir up the bark pretty deep, and mix a load or two of freſh bark with the old when you find the warmth decline, you will preſerve its heat two or three months longer. Many lay ſome hot horſe-dung in the bottom of the trench under the bark; but this ought never to be practiſed unleſs the bed is wanted ſooner than the bark would heat of itſelf, and even then there ought only to be a ſmall quantity of dung at the bottom.

The frames which cover theſe beds, ſhould be proportioned to the ſeveral plants they are deſigned to contain; if they are to cover the ananas or pine-apple, the back part ſhould be three feet high, and the lower part fifteen inches: if the bed be intended for taller plants, the frame muſt be made of a depth proportionable to them; but if it be for ſowing of ſeeds, the frame need not be above fourteen inches high at the back, and ſeven in the front; by which means, the heat will be much greater.

Hot-house, in ſalt-making, the place where they dry the ſalt, when taken out of the boiling-pan: it is ſituated near the furnace, which, by means of funnels or tubes, conveys the heat into it.

HOTCH-POT, in law, is uſed for mixing of lands given in marriage with other lands in fee which fall by deſcent; as where a man poſſeſſed of thirty acres of land has iſſue only two daughters, and after his having given with one of them ten acres in marriage, he dies poſſeſſed of the other twenty: here ſhe that is thus married, in order to gain her ſhare of the reſt of the land, muſt put her part given in marriage in hotch-pot; that is, ſhe muſt refuſe to take the ſole profits of her lands, and cauſe it to be mingled with the other, ſo that an equal diviſion may be made of the whole between her and her ſiſter; by which means, inſtead of only her ten acres, ſhe has fifteen.

HOTTENTOT-COUNTRY, the moſt ſou[thern] promontory of Africa, compr[e]hending the cape of Good Hope, and [the] reſt of the dutch ſettlements, ſituated be[tween] 15 and 35° of eaſt long. and be[tween] 23 and 35° of ſouth lat. Thoug[h] mountainous, it is a moſt fruitful country. The hottentot-nations who inhabit [the] ſouthern promontory, are ſixteen in num[ber]; and as the natives are extreme[ly] uſeful to the Dutch, they ſuffer them [to] be governed by their own laws and cuſ[toms]. They are black, and in their fl[at] noſes, thick lips, and hair, reſemble [the] negroes. It is remarkable, that all [the] women have a callous flap or ſkin wh[ich] hangs over the pudenda.

HOTTONIA, WATER-VIOLET, in bo[tany], a genus of the pentandria-mono[gynia] claſs of plants, the flower of wh[ich] conſiſts of a ſingle petal, the tube whe[re]of is equal in length to the cup, and [its] limb plain, and divided into five oval, oblong, emarginated ſegments: the fru[it] is a globoſe acuminated capſule, plac[ed] on the cup, and having only one cell, i[n] which are contained a great number [of] round ſeeds.

HOTTS, or HUTTS, are the pounces a[nd] round balls of leather, ſtuffed, and tied [to] the ſpurs of fighting cocks, to keep them from hurting one another in ſparing.

HOUDEN, a market-town of the eaſt riding of Yorkſhire, fourteen miles ſouth-eaſt [of] York.

HOUGH and HOUGHING, in agriculture. See HOE and HOEING.

HOUGH, in the manege, is that joint [of] the hinder quarter which joins the thigh to the leg.

HOVINGHAM, a market-town of the eaſt riding of Yorkſhire, ſeventeen miles north-eaſt of York.

HOULSWORTHY, a market-town [of] Devonſhire, thirty-eight miles north-weſt of Exeter.

HOUND, a hunting dog, of which there are ſeveral ſorts, as the grey-hound, gaze-hound, &c.

The grey-hound is valued for his ſwiftneſs, ſtrength, and ſagacity in purſuing the game. Thoſe of the beſt ſort have a long body, a ſharp head, ſparkling eyes, a long mouth, and ſharp teeth, little ears with thin griſtles; a ſtraight, broad, and ſtrong breaſt; his legs long, and his belly ſmall; with broad ſhoulders, round ribs, fleſhy buttocks, but not fat, and a long tail.

The beſt time to try and train grey-hounds to the game, is at twelve months old; they ſhould be kept in a ſlip while abroad, till they can ſee their courſe, and a young dog ſhould not be run till the game has been a conſiderable time on foot, leſt being over greedy of the prey, he ſtrain his limbs. The huntſman is to lead them on his left hand, if he be on foot, and on the right if on horſeback. For the method of entering greyhounds, ſee the article ENTRANCE *of hounds*.

The greyhound ought to be courſed three times a week, and rewarded with blood, which will encourage him to proſecute his game; but forget not to give the hare all the juſt advantage, that the grey-hound may ſhew his utmoſt ſtrength and ſkill before he reap the benefit of his labour. If he kill, take the hare from him, and cleaning his chops from the hare's wool, give him the liver and lights: then taking him up in your leaſh, lead him home, waſh his feet with butter and beer, put him into his kennel, and half an hour after, feed him. Upon the courſing days give him a toaſt and butter, or oil, in the morning, and nothing elſe, and then kennel him till he go to the courſe.

In the breeding of grey-hounds it ſhould be obſerved, that the beſt dog upon an indifferent bitch will not get ſo good a whelp as an indifferent dog upon the beſt bitch: that the dogs and bitches ought as near as poſſible to be of an equal age, and not to exceed four years old; however, excellent whelps are frequently produced by breeding with a young dog and an old bitch.

The general food of a grey-hound ought to be chippings, cruſts of bread, ſoft bones and griſtles; the chippings ſhould be ſcalded in beef, mutton, veal, or veniſon broth, and when it is pretty cool, made to float in good milk, and if this be given him morning and evening, it will keep him in a good ſtate of body. But if he be poor, ſickly and weak, take a ſheep's head with the wool, break it to pieces, and boil it till it is very tender, and thickening the broth with oatmeal, feed your dog with the meat and broth morning and evening. If you deſign your grey hound for a wager, give him the following diet-bread. Take half a peck of wheat-flour, and the ſame quantity of oatmeal, and having ſcattered in it an indifferent quantity of liquorice and anniſeeds, knead it up with the whites of eggs, and bake it in ſmall loaves, then ſoak it in beef or other broths, and having walked and aired him, half an hour after ſun-riſe, and half an hour after ſun-ſet, give him ſome of it to eat.

Blood-HOUND, is a dog remarkable for the keenneſs of his ſcent: he differs from the ſcotch ſluck-hound, only in the largeneſs of his ſize, and in his not being always of the ſame colour; for theſe hounds are ſometimes red, ſanded, black, white, ſpotted, and of all the colours of the other hounds. Thoſe who have a ſquare and flat noſe always pointed to the earth, are generally thought to have the beſt ſcent; they ſhould likewiſe have a ſmall head, briſk eyes, long ears hanging down, his legs of an equal length, his breaſt not deeper than his belly, and his tail nimble.

The blood hound ſeldom barks, except in the chace; and on being ſet on by the voice of the huntſman, ſeeks about for the game, and not only keeps to it while it is living, but if it be by any accident killed or wounded, will find it out by the ſcent of the blood ſprinkled on the ground.

Gaze-HOUND. See GAZE-*Hound*.

HOUND-FISH, the engliſh name of two different ſpecies of the ſqualus. See the article SQUALUS.

1. The ſmooth hound fiſh is the ſmooth ſkinned ſqualus, with obtuſe teeth: this is a large fiſh; the head is of a depreſſed form; the roſtrum is obtuſe; the mouth large; and the teeth are numerous, but ſhort, thick, obtuſe, and granulous; the noſtrils have each two apertures; the eyes are large, and ſtand pretty high on the head; the body is oblong, and of a rounded form; toward the head there are five apertures to the gills on each ſide, they ſtand in a line, running from the head to the pectoral fins; there are two back fins; the pinna ani is but one; the tail is forked or divided into two parts, and the upper portion is much longer than the other.

2. The ſqualus, with a rounded body, and with no pinna ani, is alſo called the hound-fiſh; the head is large, of a depreſſed figure, and ſubacute; the roſtrum, toward the extremity, is pellucid: this fiſh grows to about two yards in length.

HOUR, *hora*, in chronology, an aliquot part of a natural day, uſually a 24th, ſometimes a 12th.

But the word hour has not always been of the ſame ſignification; for in antient times an hour did indefinitely expreſs a ſhort

ſhort ſpace of time. It is thought too that antiently the four ſeaſons of the year, wherein the ſun finiſheth its annual courſe, had the name of hours, becauſe Horus inſtituted a certain year, conſiſting of three months, and for this reaſon the antients called ſpring, ſummer, autumn, and winter, hours, and the year itſelf horus: of which ſome footſteps appear in this, that the Greeks called their annals *Hori*; and the writers of them *horographi*. However it be, the diviſion of the day into hours is very antient, tho' the moſt antient hour is that of the twelfth part of the day.

An hour, with us, is a meaſure or quantity of time, equal to a 24th part of the natural day, or nychthemeron; or it is the duration of the 24th part of the earth's diurnal rotation. Fifteen degrees of the equator anſwer to an hour; tho' not preciſely, yet near enough for common uſe.

The hour is divided into ſixty minutes; the minute into ſixty ſeconds; the ſecond into ſixty thirds, *&c.*

To find the hour of the day, the latitude of the place, the ſun's declination, and his altitude muſt be given. Thus, Suppoſe the latitude is 51° 32′, the ſun's declination 18° north, and his altitude 40°, to find the hour of the day.

The geometrical ſolution of this problem is performed by projecting ſtereographically on the plane of the meridian the oblique angled ſpherical triangle which is made by the complement of the latitude; the complement of the ſun's altitude, and the ſun's diſtance from the elevated pole. Thus, with the chord of 60° (plate CXXXIV. fig 1.) draw the primitive circle Z O N H; quarter it; alſo draw the axis P C P thro' the poles, and the equinoctial Æ C Q, likewiſe the parallel of declination D ☉ *d* equal 18°; then draw parallel to the horizon H O, the almacanter or parallel of the ſun's altitude A *a* = 40° to cut the parallel of the ſun's declination in ☉ the place of the ſun at that time. Then through ☉ draw two great circles, one through Z and N the poles of the horizon, and the other thro' P and P the poles of the equinoctial, as Z ☉ N, and P ☉ P; which form the oblique angled ſpherical triangle P Z ☉ and the angle Z P ☉ meaſured on the line of half tangents gives the hour of the day from twelve, *viz.* 47° 20′ equal to 3 hours 9 minutes nearly, or to 51 minutes after eight in the morning, or 51 minutes before four in the afternoon. But by ſpherical trigonometry, having three ſides given; that is Z P 38° 28′ the complement of the latitude, Z ☉ 50° 00′ the complement of the ſun's altitude, and P ☉ 72° 00′ the ſun's diſtance from the elevated pole (which is the declination added to 90°, when the latitude and declination are of a contrary name; but if of one name, it is the complement of the declination:) and the angle Z P ☉ the hour of the day is found by caſe 11. of ſpherical trigonometry, as follows.

Firſt add the complement of the latitude, complement of the ſun's altitude, and the ſun's diſtance from the elevated pole, into one ſum. Secondly, From half that ſum ſubſtract the complement of the ſun's altitude, noting the half ſum, and the remainder. Then the complement arithmetical of the ſines of the complement of the latitude, and the ſun's diſtance from the pole, and the ſines of the ſaid half ſum and remainder, added together; the ſine of half this ſum, doubled, and ſubſtracted from 180 degrees, gives the hour from noon.

Side	Z P	Co. lat.	38° 28′	containing ſides S. co. ar.	—0.206168
	☉ P	Co. decl.	72° 00′	S. co. ar.	—0.021794
	Z ☉	Co. alt.	50° 00′	half ſum ſides, 80° 14′ S.	—9.993660
		Sum is,	160° 28′	remainder 30° 14′ S.	—9.702019
		Half is,	80° 14′	ſum of the 4.	—19.923641
		Co. alt.	50° 00′	ſine half ſum 66° 20′	—9.961820
		Remainder	30° 14′		

66° 20′

Which doubled gives 132° 40′

This ſubtracted from 180° 00′ leaves 47° 20′ equal to 3 hours 9′ nearly, the ſame as before.

By the ſame operation you may find the ſun's azimuth P Z ☉, if inſtead of the complement of the ſun's altitude you ſubſtract the ſun's diſtance from the pole, noting the half ſum and remainder as before.

before. And the rule will ſtand thus: To the complement arithmetical of the ſines of the complement of the latitude, and complement of the ſun's altitude, add the ſines of the aforeſaid half ſum and remainder: then the ſine of half the total of theſe four, doubled, and taken from 180 degrees, gives the ſun's azimuth from the north, in north latitude; and from the ſouth, in ſouth latitude.

If the hour of the night is required, the height of ſome ſtar muſt be taken. And it is found by adding to, or ſubſtracting, the right aſcenſion of that ſtar from that of the ſun.

There are divers kinds of hours, uſed by chronologers, aſtronomers, dialiſts, &c. Sometimes hours are divided into equal and unequal. Equal hours are the 24th part of a day and night preciſely, that is, the time wherein fifteen degrees of the equator mount above the horizon. Theſe are alſo called equinoctial hours, becauſe they are meaſured on the equinoctial; and aſtronomical, becauſe uſed by aſtronomers. They are alſo differently denominated, according to the manner of accounting them in different countries. Aſtronomical hours are equal hours, reckoned from noon, or mid-day, in a continued ſeries of twenty-four. Babyloniſh hours are equal hours reckoned in the ſame manner from ſun-riſe. The Italian hours, are alſo equal hours reckoned in the ſame manner too, from ſun-ſetting. European hours are alſo equal hours, reckoned from midnight; twelve from thence to noon, and twelve more from noon to midnight. Jewiſh, or planetary, or antient hours, are the twelfth part of the artificial day and night, each being divided into twelve equal parts. Hence, as it is only in the time of the equinoxes that the artificial day is equal to the night, it is then only that the hours of the day are equal to thoſe of the night: At other times they will be always either increaſing or decreaſing. And they will be the more or leſs unequal according to the obliquity of the ſphere.

HOUSE, *domus*, a habitation, or place built with conveniencies for dwelling in: thus, we ſay a town-houſe, country-houſe, &c.

A country-houſe is the villa of the antient Romans, the quinta of the Spaniards and Portugueſe, the cloſerie and caſſine of the French, and the vigna of the Italians.

It ought always to have wood and water near it; theſe being the principal beauties of a rural ſeat. The trees make a far better defence than hills, as they yield a cooling, and healthy air, ſhade during the heat of ſummer, and very much break the ſeverities of the winter-ſeaſon.

It ſhould not be ſituated too low, on account of the moiſture of the air; and, on the other hand, thoſe built on places expoſed to the winds are expenſive to keep in repair. In houſes not above two ſtories high, and upon a good foundation, the length of two bricks, or eighteen inches, for the heading courſe will be ſufficient for the ground-work of any common ſtructure; and ſix or ſeven courſes above the earth, to a water-table, where the thickneſs of the walls are abated, or taken in, on either ſide the thickneſs of a brick, *viz.* two inches and a quarter. But for large and high houſes of three, four, or five ſtories, with garrets, their walls ought to be three heading courſes of bricks, or twenty-eight inches at leaſt, from the foundation to the firſt water-table; and at every ſtory a water-table, or taking in, on the inſide, for the ſummers, girders, and joiſts to reſt upon, laid into the middle, or one quarter of the wall at leaſt, for the better bond. But as for the partition wall, a brick and half will be ſufficiently thick; and for the upper ſtories, a brick length, or nine inch brick wall will ſuffice.

As to the regulations concerning the houſes in London, we have taken notice of them under the article BUILDING.

Town-HOUSE, a public hall, where the magiſtrates of a town, or borough, hold their meeting for the due adminiſtration of their polity.

Work HOUSE, a place built at the charge of a county, town, or pariſh, where indigent, vagrant, and idle people, as alſo ſtrumpets, gameſters, and other rogues, are ſet to work, and furniſhed with cloathing, diet, &c. Such are the London work-houſe, Bridewell, and that of the pariſh of St. Margaret, Weſtminſter.

The juſtices, at their ſeſſions, are required to appoint governors, or maſters of ſuch houſes, whoſe office is to ſet the perſons committed to their charge to work, and to give them moderate correction by whipping, &c. if refractory; and to render a true account every quarter

feffions, of perfons committed into their cuftodies.

HOUSE-BOTE, in law, an allowance of timber out of the lord's woods, for the repairs of an houfe: this is otherwife called eftovers.

HOUSE is alfo ufed for a noble family, or race of illuftrious perfons, defcended from the fame ftock.

HOUSE, in aftrology, denotes the twelfth part of the heavens.

The divifion of the heavens into houfes, is founded upon the pretended influence of the ftars, when meeting in them, on all fublunary bodies. Thefe influences are fuppofed to be good or bad, and to each of thefe houfes particular virtues are affigned, on which aftrologers prepare and form a judgment of their horofcopes. The horizon and meridian are two circles of the celeftial houfes, which divide the heavens into four equal parts, each containing three houfes; fix of which are above the horizon, and fix below it: and fix of thefe are called eaftern, and fix weftern houfes.

A fcheme or figure of the heavens is compofed of twelve triangles, alfo called houfes, in which is marked the ftars, figns and planets fo included in each of thefe circles. Every planet has likewife two particular houfes, in which it is pretended, that they exert their influence in the ftrongeft manner; but the fun and moon have each of them only one, the houfe of the former being Leo, and that of the later Cancer.

The houfes in aftrology have alfo names given them according to their qualities; the firft is the houfe of life; this is the afcendant, which extends five degrees above the horizon, and the reft below it; the fecond is the houfe of riches: the third the houfe of brothers: the fourth, in the loweft part of the heavens, is the houfe of relations, and the angle of the earth: the fifth, the houfe of children: the fixth, the houfe of health: the feventh, the houfe of marriage, and the angle of the weft: the eighth, the houfe of death: the ninth, the houfe of piety: the tenth the houfe of offices: the eleventh, the houfe of friends: and the twelfth, the houfe of enemies.

HOUSE-BREAKING, or ROBBING, is the breaking into and robbing a houfe in the day-time, the fame crime being termed burglary, when done by night; both are felony, without benefit of clergy. See the article BURGLARY.

HOUSE *of Lords.*
HOUSE *of Commons.* } See PARLIAMENT.

Green-HOUSE. See the article GREEN.

Hot HOUSE. See the article HOT.

HOUSE-LEEK, *fedum*, in botany. See the article SEDUM.

HOUSHOLD, the whole of a family confidered collectively, including the miftrefs, children, and fervants. But the houfehold of a fovereign prince includes only the officers and domeftics belonging to his palace.

The principal officers of his majefty's houfhold, are, the lord fteward, lord chamberlain of the houfhold, the groom of the ftole, the mafter of the great wardrobe, and the mafter of the horfe. The civil government of the king's houfe is under the care of the lord fteward of the king's houfhold, who, as he is the chief officer, all his commands are obferved and obeyed. His authority extends over all the other officers and fervants, except thofe of his majefty's chapel, chamber, and ftable, and he is the judge of all crimes committed either within the court or the verge. See the articles STEWARD and VERGE.

Under him are the treafurer of the houfhold, the comptroller, cofferer, the mafter of the houfhold, the clerks of the green-cloth, and the officers and fervants belonging to the accounting-houfe, the marfhalfea, the verge, the king's kitchen, the houfhold kitchen, the acatery, bakehoufe, pantry, buttery, cellar, paftry, &c. Next to the lord fteward is the lord chamberlain of the houfhold, who has under him the vice-chamberlain, the treafurer, and comptroller of the chamber; forty-eight gentlemen of the privy-chamber, twelve of whom wait quarterly, and two of them lie every night in the privy-chamber; the gentleman ufher, the grooms of the great chamber, the pages of the prefence-chamber; the mace-bearers, cup-bearers, carvers, muficians, &c. See *Lord* CHAMBERLAIN *of the Houfhold.*

The groom of the ftole has under him the eleven other lords of the bed-chamber, who wait weekly in the bed-chamber, and by turns lie there a nights on a pallat-bed; and alfo the grooms of the bed-chamber, the pages of the bed-chamber and back ftairs, &c. See *Groom of the* STOLE.

The mafter or keeper of the great wardrobe has under him, a deputy, comptroller, clerk of the robes, brufher, &c. and a number of tradefmen and artificers,

tificers, who are all ſworn ſervants to the king.

The maſter of the horſe has under his command the equeries, pages, footmen, grooms, coachmen, farriers, ſadlers, and all the other officers and tradeſmen employed in his majeſty's ſtables.

Next to the civil liſt of the king's court, is the military, conſiſting of the band of gentlemen penſioners, the yeomen of the guard, and the troops of the houſhold: of which, the two firſt guard the king above ſtairs.

When the king dines in public, he is waited upon at table by his majeſty's cup-bearers, carvers, and gentlemen ſewers; the muſicians playing all the time. The dinner is brought up by the yeomen of the guard, and the gentlemen ſewers ſet the diſhes in order. The carvers cut for the king, and the cup-bearers ſerve him the drink with one knee on the ground, after he has firſt taſted it in the cover.

HOUSING, among bricklayers, a term uſed for a tile or brick that is warped, or caſt crooked or hollow in burning.

Tiles are apt to be houſing or hollow on the ſtruck ſide, or that which was uppermoſt in the mould, and bricks on the contrary ſide.

HOUSING, or HOUZING, in the manege, is either boot or ſhoe-houſing: the former is a piece of ſtuff made faſt to the hinder part of the ſaddle, and covers the croupe of the horſe, either for ornament, or to cover the horſe's leanneſs, or to preſerve the rider's cloaths from being daubed with the ſweat *&c.* of the horſe.

The houſing, for ſuch as ride with ſhoes, is commonly a piece of ſcarlet cloth embroidered with gold fringe, and put round the ſaddle ſo as to cover the croupe, and deſcend to the lower part of the belly, to ſave the gentleman's ſilk ſtockings when he mounts in his ſhoes.

HOUSTONIA, in botany, a genus of the tetrandria-monogynia claſs of plants, the corolla of which conſiſts of a ſingle petal of a funnel-ſhape, with a patent limb divided into four roundiſh ſegments; the fruit is a roundiſh, didymous, bivalve capſule, with two cells, each containing a ſingle ſeed.

HOW, or HOE. See the article HOE.

HOWLE, among ſhip-carpenters, is ſaid of a ſhip whoſe futtocks are ſcarfed and bolted into the ground timbers, and the plank laid on them to the orlop.

HOY, in naval architecture, a ſmall veſſel fitted only with one maſt. See SHIP.

HOYE, a town of Weſtphalia, capital of a county of the ſame name, and ſubject to the elector of Hanover: eaſt long. 9°, north lat. 53° 5'.

HUBERT, or St. HUBERT, a town of the dutchy of Luxemburg, thirty miles ſouth-eaſt of Namur.

HUCKSTER, a perſon who ſells proviſions, or ſmall wares, by retail.

HUDSON'S BAY, a large mediterranean ſea of north America, ſituated between 51° and 63° of north lat. and of unequal breadth from 130 to 35 leagues.

HUDSON'S STREIGHTS, giving entrance into Hudſon's Bay, lie between 65° and 75° of weſt long.

HUDSON'S RIVER, riſes near the lake Champlain, in Canada, and falls into the Atlantic, a little below the city of New-York.

HUDSON'S BAY *Company*. See the article COMPANY.

HUE AND CRY, in law, the purſuit of a perſon who has committed felony on the highway.

If the party robbed, or any in the company of a perſon either robbed or murdered, go to the conſtable of the next town, and require him to raiſe hue and cry, and to purſue the offender, deſcribing him, and giving an account as near as he can, of the courſe he ſteered; the conſtable is immediately to call upon the pariſh for aid in ſeeking after the felon, and if he cannot be found within the bounds of that pariſh, then he is to give the next conſtable warning, and the the next, till the offender be apprehended, or at leaſt purſued to the ſea-ſide. If perſons are not ready at the ſummons of the ſheriff, and cry of the county to engage in the purſuit, they may be fined: and in caſe the inhabitants of any hundred, after hue and cry is made, neglect to purſue the ſame, they ſhall be liable to pay one half of the damages recoverable againſt the hundred in which the robbery was committed.

In making the hue and cry, diligent ſearch is to be made in all ſuſpected places, and not only pariſh officers, but all private perſons that purſue the hue and cry may arreſt the bodies of ſuch perſons, as in their purſuit they ſhall find any ways ſuſpicious, and carry them before a juſtice of the peace of the county where taken, and in that caſe, the arreſting a perſon, though he ſhould not be guilty, is lawful. 13 Edw I. If the offender is not taken within forty days

after the robbery is committed, the party robbed may make oath before a juftice of the peace of the county where the robbery was committed, of the time and place of the robbery, and of what money he was robbed, and that he did not know any of the robbers; and afterwards, within twenty days fuch perfon may bring his action againft the hundred, which muft be fued out within a year after the robbery. 27 Eliz. By a late ftatute, notice of the robbery is to be inferted in the Gazette, defcribing the robber and robbery, *&c.* and procefs againft the hundred, is not to be ferved on any inhabitant, except the high conftable, who is to appear thereto, and to defend the action, *&c.* 8 Geo. II. c. 16.

HUEGLY, a large town in the Eaft Indies, fituated on an ifland in the moft wefterly branch of the river Ganges, in the province of Bengal: eaft long. 87° north lat. 23°.

HUEN, or WEEN. See the article WEEN.

HUERS, or CONDERS, in the herring-fifhery. See CONDERS and FISHERY.

HUETTE, a city of Spain, in the province of New Caftile, fixty-feven miles eaft of Madrid: weft long. 2° 45′, north lat. 40°, 35′.

HUGONIA, in botany, a genus of the decandria-pentagynia clafs of plants, the corolla of which confifts of five large, roundifh, and patent petals: the fruit is a globofe berry, containing only one hard and ftriated feed.

The hugonia, a fhrub of eight or ten feet high, is a native of the Eaft-Indies.

HUGUENOTS, a name given by way of contempt to the Calvinifts of France.

The name had its rife in the year 1560; but authors are not agreed as to its origin. The moft plaufible opinion, however, is that of Pafquer, who obferves, that at Tours, the place where they were firft thus denominated, the people had a notion, that an apparition or hobgoblin, called king Hugon, ftrolled about the ftreets in the night-time; from whence, as thofe of the reformed religion met chiefly in the night to pray, *&c.* they called them huguenots, that is, the difciples of king Hugon.

HUISSIER, a ferjeant, ufher, or beadle.

HULKS, large veffels ufed in fetting the mafts of fhips. See the article SHIP.

HULL, in the fea-language, is the main body of a fhip, without either mafts, yards, fails, or rigging. Thus to ftrike a hull in a ftorm is to take in her fails, and to lafh the helm on the lee-fide of the fhip; and to hull, or lie a hull, is faid of a fhip whofe fails are thus taken in and helm lafhed a-lee.

HULL, in geography, a ftrong fea-port town in the eaft riding of Yorkfhire, fituated on the river Hull, near the mouth of the Humber, thirty-two miles fouth-eaft of York.

It is a place of good trade, and has a yard for building men of war and other veffels.

HULLOCK *of a fail*, is a fmall part of a fail, let loofe in a great ftorm; it is chiefly ufed in the mizen to keep the fhip's head to the fea, when all the reft of the fail is made up, except a little at the mizen-yard-arm.

HULPEN, a town of the Auftrian Netherlands, in the province of Brabant, fituated nine miles fouth eaft of Bruffels: eaft long. 4° 22′, north lat. 50° 42′.

HULST, the capital of the county of Woes, in Dutch Flanders, fituated fifteen miles north-eaft of Ghent: eaft long. 3° 50′, north lat. 51° 20′.

HUMAN, in general, is an appellation given to whatever relates to mankind; thus we fay, the human foul, human body, human laws, *&c.* See the articles SOUL, BODY, *&c.*

In order to form a juft idea of the human body, fays Dr. Mead, it ought to be confidered as an hydraulic machine contrived with the moft exquifite art, in which there are numberlefs tubes, properly adjufted and difpofed, for the conveyance of fluids of different kinds, as the blood, animal fpirits, lymph, *&c.* See the articles BLOOD, SPIRITS, *&c.*

The folids likewife make a very neceffary part of the human body; fome, as the bones, ferving as fupports and levers to regulate its motions; others as the inteftines and blood-veffels, ferving to prepare and convey nourifhment to its various parts; and, finally, others, as the mufcles, acting under the direction of the mind like fo many ropes and pullies. See the articles BONE, INTESTINES, VEIN, ARTERY, MUSCLE, *&c.*

As therefore health confifts in regular motions of the fluids, together with a proper ftate of the folids, it is next to a miracle that fo complicated a machine fhould hold out to extreme old age: for a body, fuch as ours, cannot poffibly retain life for ever; which is not difficult to account for, becaufe the membranous fibres of the blood-veffels, which were made


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Fig. 1. HOOKS.

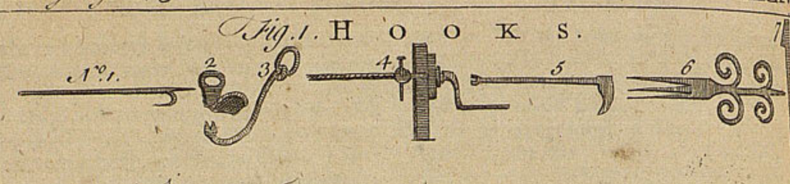


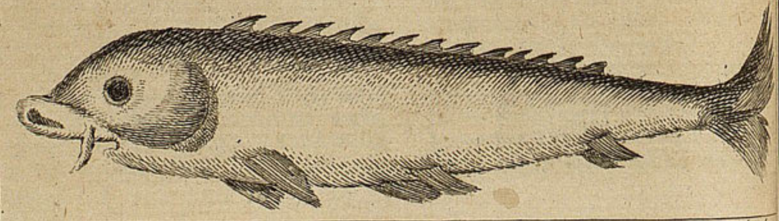
Fig. 2. HORMINUM, CLARY.

Fig: 3. Reduction of a Luxated HUMERUS.

No. 1.

No. 2.

Fig: 4. HUSO, the ISINGLASS-FISH.



made elaſtic in order to drive their included juices forward, become gradually harder, and at length rigid; whence they are rendered incapable of executing their offices, and the ſecretions of the ſeveral parts are diminiſhed by degrees: and that this is the caſe, appears from diſſections of the bodies of very old people; the inſides of their arteries being ſometimes found oſſified here and there, whereby they have almoſt entirely loſt their ſpringineſs; and the orifices of the natural ducts, are often obſerved to be quite cartilaginous.

HUMANITY, the peculiar nature of man, whereby he is diſtinguiſhed from all other beings. See the article MAN.

HUMANITIES, in the plural, ſignify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*; for teaching of which, there are profeſſors in the univerſities of Scotland, called humaniſts. See GRAMMAR, RHETORIC, *&c.*

HUMBER, a river formed by the Trent, the Ouſe, and ſeveral other ſtreams united. It divides Yorkſhire from Lincolnſhire, and falls into the German Sea at Holderneſs.

HUMBLE BEE, the engliſh name of ſeveral ſpecies of apis, diſtinguiſhed by their colours, black, tawney, reddiſh, *&c.* See the article APIS.

HUMECTATION, in pharmacy, the moiſtening, or preparing medicines by ſteeping them in water; either to ſoften and relax their ſolid parts, or to prevent the evaporation of their more ſubtile contents.

HUMERUS, in anatomy, the upper part of the arm, between the ſcapula and elbow.

The os humeri or brachii, as it is called, is articulated at one end with the ſcapula, and at the other to the ulna and radius. See the articles ARM, BRACHIUM, *&c.*

As to the motion of the os humeri, it is evidently the moſt free and extenſive of that of any bone in the human body: being furniſhed with ſeveral flexor and extenſor muſcles. See the articles FLEXOR and EXTENSOR.

Luxation of the HUMERUS. This bone, from the length and laxity of its ligaments, the largeneſs of its motion, and the ſhallowneſs of the cavity in the ſcapula into which it is articulated, is very ſubject to be luxated.

As ſoon as this is diſcovered to be the caſe, the patient ſhould be ſeated on the floor, or on a low ſtool, while two aſſiſtants ſtretch his arm; which being ſufficiently extended, the ſurgeon ought to elevate the head of the humerus by means of a napkin, hung about his neck, and put under the arm-pit; and at the ſame time move it backward and forward, as he ſhall ſee occaſion, till it is happily reduced into its place. See plate CXXXIV. fig. 2.

However, it often happens, that this force is incapable of extending the arm ſufficiently; ſo that it becomes neceſſary to have recourſe to machines, as the ambe of Hippocrates; which conſiſts of a pillar or fulcrum A A (plate CXXXV. fig. 3. n° 1.) and the moveable lever B C, which is bound to the arm in the manner repreſented in the figure by the ligatures E E E. When this is done, the end of the lever B is carefully and gradually preſſed downward, by which means the other end C is moved upward; and thus the luxated arm is both extended, and replaced at the ſame time.

This inſtrument having received many improvements ſince the days of Hippocrates, we ſhall here give the deſcription of a portable one, invented by Mr. Freke. It conſiſts of two boxes, A, A, (plate CXXXV. fig. 3. n° 2.) joined together by a hinge, F, in the middle; wherein are contained, when folded together, every thing neceſſary for reducing a diſlocated ſhoulder.

The length of this inſtrument, when ſhut up, is one foot eight inches, its breadth nine inches, and its thickneſs three inches and a quarter. When it is opened, it is kept ſo by two hooks fixed on the backſide of it; and, when one end of it ſtands on the ground, the other ſtands high enough to become a fulcrum, or ſupport of the lever B B, which is fixed on a roller *b*, by a large wood-ſcrew, which turning ſideways, as well as with the roller, it obtains a circumrotatory motion, ſo that it will ſerve to reduce a luxation, either backward, forward, or downward. The roller on which the lever is fixed, is juſt the diameter of the depth of one of the boxes, into which are driven two iron pins, the ends of which are received by the two ſides of the box, which are an inch thick. The lever is two feet four inches long, and is cut off and joined again by two hinges C, to fold up ſo as to be contained in the boxes. On the backſide of it is a hook, to keep it ſtraight. One other end of it is to hang over the roller about an

an inch and a half, which is to be excavated and covered with buff leather, for the more eafy reception of the head of the os humeri. Two iron cheeks D are fcrewed on each fide of the lever, to receive through them an iron roller, which has two holes through it, to receive two cords coming from a brace E, fixed on the lower head of the os humeri; for if it be applied on the mufcular part of the arm, it never fails flipping down to the joint, before you can extend the limb. The iron roller has a fquare end, on which is fixed a wheel G, within the cheek notched round, which works as a ratchet, on a fpring-ketch underneath the lever, by which it is ftopped, as you wind it with a winch; and may at pleafure be let loofe, as there fhall be occafion for it, by difcharging the ketch. The brace E, compared with common bandages, is of more confequence than can eafily be imagined by unexperienced perfons. It confifts of a large piece of buff leather, big enough to embrace the arm, fewed on two pieces of ftrong iron curved plates, riveted together, one of them having an eye at each end to faften two cords in; the other is bent at the ends into two hooks, which are to receive the cords, after they have croffed over the arm above.

In order to keep the patient fteady in his chair from coming forward, or letting the fcapula rife up on depreffing the lever, after the limb is extended by the winch, there muft be fixed over the fhoulder a girth, H, H, with two hooks at the ends of it, long enough to reach to the ground on the other fide, where it muft be hooked into a ring I, fcrewed into the floor for that purpofe.

We ought not to omit obferving here, that there are feveral other contrivances invented both by antient and modern furgeons for reducing a luxation of the humerus; fome of which the reader will find defcribed in Heifter's Surgery, P. I. B. iii. c. 7.

HUMETTY, or CROSS HUMETTY, in heraldry, a plain crofs of an equal length every way. See the article CROSS.

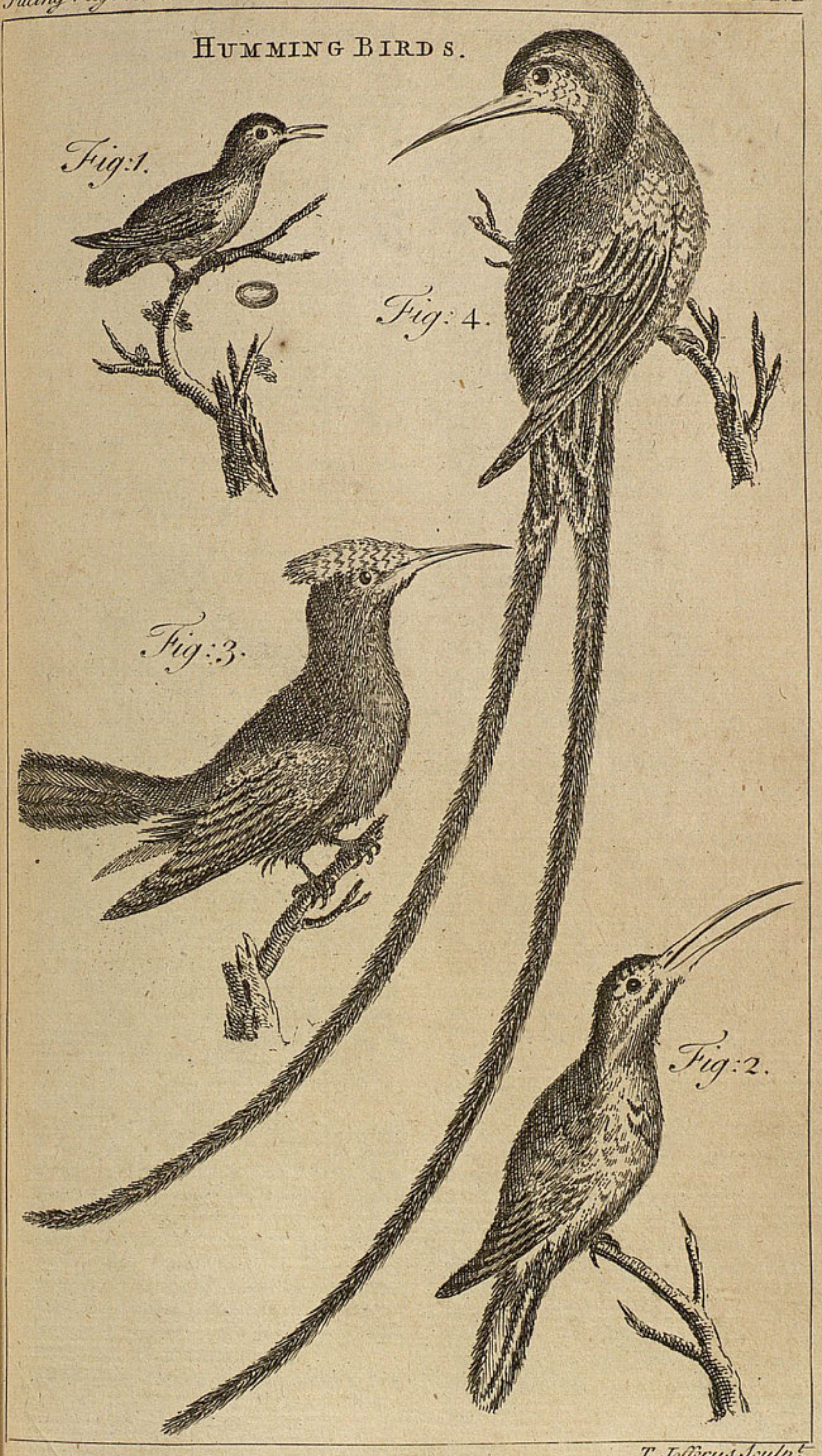
HUMIDITY, that quality in bodies whereby they are capable of wetting other bodies. This differs very much from fluidity, and feems to be merely a relative thing, depending upon the congruity of the component particles of the liquor to the pores of fuch particular bodies, as it is capable of adhering to, penetrating a little into, or wetting. Thus, for inftance, quickfilver is not a moift thing with regard to our hands or clothes, but may be called fo in reference to gold, tin, or lead, to whofe furfaces it will perfectly adhere, and render them foft and moift. Even water itfelf, which almoft wets every thing, and is the great ftandard of moifture and humidity, is not capable of wetting every thing, for it ftands or runs off eafily in globular drops from the leaves of cabbages, and many other plants, and will not wet the feathers of ducks, fwans, and other water-fowls. Add that the texture alone may caufe the fluid to be humid, as is plain in that neither quickfilver, lead, or bifmuth alone, will ftick upon glafs; yet being mixed together, they will form a mafs that will do fo, as appears from fuch a compofition being frequently ufed in foliating looking-glaffes.

HUMIDUM RADICALE, or *radical moifture*, among phyficians, feems to amount to no more than the pureft and moft delicate part of the nutritious matter in a condition to be affimilated.

By too much heat, as in fevers, hectics, *&c.* this humidity is too haftily exhaufted and fpent.

HUMILIS MUSCULUS, one of the depreffor mufcles of the eye. See EYE.

HUMMING BIRD, *trochilus*, in ornithology, a genus of birds, of the order of the pafferes, remarkable for being the fmalleft of all known birds. Their beak is of a fubulated figure, but fine as a thread: it is longer than the head, and not perfectly ftraight: add to this, that they have a fine tube or pipe, which they can extend beyond the point of the beak. Of this fingular genus, there are feveral elegant fpecies. 1. The leaft fpecies of all the humming-birds is figured (plate CXXXVI. fig. 1.) of its natural bignefs and fhape: the upper part of its body is of a dirty brown, and the under part of a dirty white. 2. The little brown one, variegated with dark fpots, is likewife figured (*ibid.* fig. 2.) as big as life. 3. The crefted humming-bird, reprefented (*ibid.* fig. 3.) as big as the life, is a very elegant fpecies: the top of the head, from the bill to the hinder part which ends in a creft, is firft green, and, towards the the hinder part, dark blue; both of a fine luftre: the upper part of its body is a dark green, intermixed with gold-colour: the quill-feathers are of a purple-colour, and the tail is of a bluifh black.


Humming Birds.
Fig: 1.
Fig: 4.
Fig: 3.
Fig: 2.
T. Jefferys Sculpt.

4. The long-tailed, black-cap humming-bird, likewiſe engraved (*ibid.* fig. 4.) of its natural bigneſs, has an extremely long tail made up of only two feathers; which being of a very looſe texture, are eaſily ruffled with the leaſt breath of air: this is one of the largeſt ſpecies.

There are a great many other ſpecies of humming-birds, a deſcription and figures of which may be ſeen in Edward's Hiſtory of Birds.

HUMORISTS, *gli humoriſti*, a celebrated academy of learned men at Rome, firſt eſtabliſhed by Paul Mancini. The device of this academy is a cloud; which being raiſed on vapours from the ſalt water of the ſea, returns again freſh, with this hemiſtich from Lucretius, *Redit agmine dulci.*

HUMOROSI, the name of another academy at Cortona in Italy, which muſt not be confounded with that of the humoriſts.

HUMOUR, *humor*, in a general ſenſe, denotes much the ſame with liquid or fluid. See the article FLUID.

The antients ſeem to have called the nutritious juices the radical humour; and to have conſtituted as a cauſe of diſeaſes, a diſproportion betwixt the innate heat and radical moiſture or humour. They alſo made four humours in the blood. See the article BLOOD.

HUMOURS *of the eye*, are the cryſtalline, vitreous, and aqueous; for a deſcription of which, ſee the articles EYE, CRYSTALLINE, *&c.*

HUMOUR is alſo uſed for the peculiar temper of a perſon, ariſing from the conſtitution and prevalence of this or that humour. See the articles CONSTITUTION and TEMPERAMENT.

We frequently impute to an unlucky or croſs accident, ſays the Abbé du Bos, thoſe chagrines whoſe origin is entirely in the intemperature of our humours, or in ſome diſpoſition of the air, which oppreſſes our machine.

HUMOUR, in dramatic poetry, is eſteemed a ſubordinate ſpecies of what is more uſually called manners. See MANNERS.

Every paſſion wears two different faces; one ſerious and ſolemn, fit only for tragedy; and the other merry and ridiculous, called humour, and proper for comedy. The engliſh poets have excelled thoſe of all other nations in this particular: and, indeed, ours is the only language that has a name for it.

To be always witty only becomes a few characters; ſo that it is neceſſary to call in the aſſiſtance of humour, to prevent the other dramatic perſons from going into the common ſtyle and manner: hence humour may be looked on as the true ſpirit and wit of comedy. See WIT.

HUMULUS, the HOP, in botany. See the article HOP.

HUMUS, in natural hiſtory, the name by which Linnæus calls earth. See the article EARTH.

HUNDRED, *hundredum*, or *centuria*, a part or diviſion of a county, which was antiently ſo called from its containing an hundred families, or from its furniſhing an hundred able men for the king's wars. After king Alfred's dividing this kingdom into counties, and giving the government of each county to a ſheriff, theſe counties were divided into hundreds, of which the conſtable was the chief officer. The grants of hundreds were at firſt made by the king to particular perſons; but they are not now held by grant or preſcription; their juriſdiction being devolved to the county-court; a few of them only excepted, that have been by privilege annexed to the crown, or granted to ſome great ſubjects, and ſtill remain in the nature of a franchiſe.

HUNDRED-WEIGHT. See the article WEIGHT.

HUNGARICUS MORBUS, a diſeaſe ſo called from its being firſt obſerved in the imperial army, in 1556.

It is thought to have been a compound fever, partaking of the nature both of the bilious and hoſpital fevers. See the article BILIOUS and HOSPITAL-FEVER.

HUNGARY, a kingdom bounded by the Carpathian mountains, which divide it from Poland, on the north; by Tranſilvania and Walachia on the eaſt; by the river Drave, which ſeparates it from Sclavonia, on the ſouth; and by Auſtria and Moravia on the weſt. It is one continued plain of 300 miles long, and is ſituated between 16° and 23° of eaſt long. and between 45° and 49° of north lat. It is now ſubject to the empreſs queen.

HUNGARY-WATER, a diſtilled water, ſo denominated from a queen of Hungary, for whoſe uſe it was firſt prepared.

Quincy gives the following directions for making it. Take of freſh gathered flowers of roſemary, two pounds; rectified ſpirits of wine, two quarts; put them together, and diſtil them immediately in balneo.

Or,

Or, take of fresh tops of rosemary, one pound and a half; proof spirit, one gallon; and distil in balneo till five pints are obtained.

HUNGER, an uneasy sensation, which creates an appetite or desire of food. See the article FOOD.

Hunger is by some attributed to a sharp acrimonious humour, which vellicates the coats of the stomach; others, who deny the existence of any such liquor, attribute it to the attrition or rubbing of the coats of the stomach; and others, again, account for it from the acidity of the blood.

HUNGERFORD, a market-town of Berkshire, situated on the river Kennet, 24 miles west of Reading.

HUNGRY EVIL, among farriers, an excessive desire in horses to eat, which sometimes proceeds from catching cold, or from travelling long in frost and snow, or through barren places.

For the cure, give him great slices of bread, toasted and steeped in sack, to comfort his stomach; or give him wheat-flour in wine or milk, a quart at a time. But there is nothing better than to feed him moderately several times a day with good bean-bread well baked, or with oats well dried and sifted.

HUNNINGHEN, a town of Germany, in the landgraviate of Alsace, situated on the Rhine, three miles north of Basil: east long. 7° 35′, north lat. 47° 37′.

HUNNOBY, a market-town in the east riding of Yorkshire, situated thirty-four miles north-east of York.

HUNTER, a name given to a hunting-horse. See the article HORSE.

HUNTING, the exercise or diversion of pursuing four-footed beasts of game. See the article GAME.

Four-footed beasts are hunted in the fields, woods, and thickets, and that both with guns and grey-hounds.

Birds, on the contrary, are either shot in the air, or taken with nets and other devices, which exercise is called fowling; or they are pursued and taken by birds of prey, which is called hawking. See the articles FOWLING and HAWKING.

The pursuing of four-footed beasts, as badgers, deer, does, roebucks, foxes, hares, &c. properly termed hunting, is a noble exercise, serving not only to recreate the mind, but to strengthen the limbs, whet the stomach, and chear up the spirits. However, all sorts of weather are not proper for hunting; high winds and rain being great obstacles to it. In the spring season, this diversion should be taken in the night-time with nets; in the summer, the morning is the most proper time for it; and in the winter, it should only be followed from nine in the morning till two in the afternoon. The general rule is, that you place yourself under the wind, where you design to wait for game.

Hunting is practised in a different manner, and with different apparatus, according to the nature of the beasts which are hunted, a description of whom may be found under their respective articles.

With regard to the seasons, that for hart and buck-hunting begins a fortnight after midsummer, and lasts till holy-rood-day; that for the hind and doe, begins on holy-rood-day, and lasts till candlemas; that for fox-hunting begins at christmas, and holds till lady-day; that for roe-hunting begins at michaelmas, and ends at christmas; hare-hunting commences at michaelmas, and lasts till the end of February; and where the wolf and boar are hunted, the season for each begins at christmas, the first ending at lady-day, and the latter at the purification.

When the sportsmen have provided themselves with nets, spears, and a hunting-horn, to call the dogs together; and likewise with instruments for digging the ground, the following directions will be of use to them in the pursuit of each sort of game.

Badger-HUNTING. In doing this, you must seek the earths and burrows where he lies, and in a clear moonshine-night go and stop all the burrows, except one or two, and therein place some sacks, fastened with drawing strings, which may shut him in as soon as he straineth the bag. Some use no more than to set a hoop in the mouth of the sack, and so put it into the hole; and as soon as the badger is in the sack and straineth it, the sack slippeth off the hoop and follows him into the earth, so he lies tumbling therein till he is taken. These sacks or bags being thus set, cast off the hounds, beating about all the woods, coppices, hedges and tufts, round about, for the compass of a mile or two, and what badgers are abroad, being alarmed by the hounds, will soon betake themselves to their burrows; and observe that he who is placed to watch the sacks, must stand close and upon a clear wind; otherwise,

wiſe the badger will diſcover him, and will immediately fly ſome other way into his burrow. But if the hounds can encounter him before he can take his ſanctuary, he will then ſtand at a bay like a boar, and make good ſport, grievouſly biting and clawing the dogs, for the manner of their fighting is lying on their backs, uſing both teeth and nails; and by blowing up their ſkins defend themſelves againſt all bites of the dogs, and blows of the men upon their noſes as aforeſaid. And for the better preſervation of your dogs, it is good to put broad collars about their necks made of grey ſkins.

When the badger perceives the terriers to begin to yearn him in his burrow, he will ſtop the hole betwixt him and the terriers, and if they ſtill continue baying, he will remove his couch into another chamber, or part of the burrow, and ſo from one to another, barricading the way before them, as they retreat, until they can go no further. If you intend to dig the badger out of his burrow, you muſt be provided with the ſame tools as for digging out a fox; and beſides, you ſhould have a pail of water to refreſh the terriers, when they come out of the earth to take breath and cool themſelves. It will alſo be neceſſary to put collars of bells about the necks of your terriers, which making a noiſe may cauſe the badger to bolt out. The tools uſed for digging out of the badger being troubleſome to be carried on men's backs, may be brought in a cart. In digging, you muſt conſider the ſituation of the ground, by which you may judge, where the chief angles are; for elſe, inſtead of advancing the work, you will hinder it. In this order you may beſiege them in their holds, or caſtles, and may break their platforms, parapets, caſemates, and work to them with mines and countermines, until you have overcome them.

Having taken a live and luſty badger, if you would make ſport, carry him home in a ſack, and turn him out in your court-yard, or ſome other incloſed place, and there let him be hunted and worried to death by your hounds.

There are the following profits and advantages which acrue by killing this animal. Their fleſh, blood, and greaſe, tho' they are not good food, yet are very uſeful for phyſicians and apothecaries for oils, ointments, ſalves, and powders for ſhortneſs of breath, the cough of the lungs, for the ſtone, ſprained ſinews, colt-aches, &c. and the ſkin being well dreſſed, is very warm and good for antient people, who are troubled with paralytic diſtempers.

Buck-Hunting. Here the ſame hounds and methods are uſed, as in running the ſtag; and, indeed, he that can hunt a hart or ſtag well, will not hunt a buck ill.

In order to facilitate the chace, the game-keeper commonly ſelects a fat buck out of the herd, which he ſhoots in order to maim him, and then he is run down by the hounds.

As to the method of hunting the buck: the company generally go out very early for the benefit of the morning, ſometimes they have a deer ready lodged, if not, the coverts are drawn till one is rouz'd; or ſometimes in a park a deer is pitched upon, and forced from the herd, then more hounds are laid on to run the chace: if you come to be at a fault, the old ſtaunch hounds are only to be relied upon till you recover him again: if he be ſunk and the hounds thruſt him up, it is called an imprime, and the company all ſound a recheat; when he is run down, every one ſtrives to get in to prevent his being torn by the hounds, fallow-deer ſeldom or never ſtanding at bay.

He that firſt gets in, cries hoo-up, to gives notice that he is down and blows a death. When the company are all come in they paunch him and reward the hounds; and generally the chief perſon of quality amongſt them *takes ſay*, that is, cuts his belly open, to ſee how fat he is. When this is done, every one has a chop at his neck, and the head being cut off is ſhewed to the hounds to encourage them to run only at male deer, which they ſee by the horns, and to teach them to bite only at the head: then the company all ſtanding in a ring, one blows a ſingle death, which being done all blow a double recheat, and ſo conclude the chace with a general halloo of hoo-up, and depart the field to their ſeveral homes, or to the place of meeting; and the huntſman, or ſome other, hath the deer caſt acroſs the buttocks of his horſe, and ſo carries him home.

Fox-Hunting makes a very pleaſant exerciſe, and is either above or below ground.

1. Above ground. To hunt a fox with hounds, you muſt draw about groves, thickets,

thickets, and bushes near villages. When you find one, it will be neceffary to ftop up his earth the night before you defign to hunt, and that about midnight, at which time he is gone out to prey: this may be done, by laying two white fticks acrofs in his way, which he will imagine to be fome gin or trap laid for him; or elfe, they may be ftopped up with black-thorns and earth mixed together.

At firft, only caft off your fure finders, and as the drag mends, add more as you dare truft them. The hound firft caft off fhould be old and ftaunch, and when you hear fuch a hound call on merrily, you may caft off fome others to him; and when they run it on the full cry, caft off the reft: thus you fhall complete your paftime. The words of comfort are the fame which are ufed in other chaces. The hounds fhould be left to kill the fox themfelves, and to worry and tear him as as much as they pleafe: fome hounds will eat him with eagernefs.

When he is dead, hang him at the end of a pike-ftaff, and halloo in all your hounds to bay him; but reward them with nothing belonging to the fox, for it is not good, neither will the hounds in common eat it.

2. Under ground. If in cafe a fox does fo far efcape as to earth, countrymen muft be got together with fhovels, fpades. mattocks, pickaxes, &c. to dig him out, if they think the earth not too great. They make their earths as near as they can in ground that is hard to dig, as in clay, ftony ground, or amongft the roots of trees; and their earths have commonly but one hole; and that is ftraight a long way in before you come at their couch. Sometimes craftily they take poffeffion of a badger's old burrow, which hath a variety of chambers, holes, and angles.

Now to facilitate this way of hunting the fox: the huntfmen muft be provided with one or two terriers to put into the earth after him, that is to fix him into an angle; for the earth often confifts of many angles: the ufe of the terrier is to know where he lies, for as foon as he finds him he continues baying or barking, fo that which way the noife is heard that way dig to him. Your terriers muft be garnifhed with bells hung in collars, to make the fox bolt the fooner; befides the collars will be fome fmall defence to the terriers.

The inftruments to dig withal are thefe; a fharp pointed fpade, which ferves to begin the trench, where the ground is hardeft, and broader tools will not fo well enter; the round hollowed fpade, which is ufeful to dig among roots, having very fharp edges; the broad flat fpade to dig withal, when the trench has been pretty well opened, and the ground fofter; mattocks and pickaxes to dig in hard ground, where a fpade will do but little fervice; the coal-rake to cleanfe the hole, and to keep it from ftopping up; clamps, wherewith you may take either fox or badger out alive to make fport with afterwards. And it would be very convenient to have a pail of water to refrefh your terriers with after they are come out of the earth to take breath.

After this manner you may befiege a fox, &c. in their ftrongeft holes and caftles, and may break their cafemates, platforms, parapets, and work to them with mines and countermines till you have obtained what you defired. But for the managing thefe dogs, fee Terrier.

Hare-Hunting. As, of all chaces, the hare makes the greateft paftime; fo it gives no fmall pleafure, to fee the craft of this fmall animal for her felf-prefervation. If it be rainy, the hare ufually takes to the high-ways; and if fhe come to the fide of a young grove, or fpring, fhe feldom enters, but fquats down till the hounds have over-fhot her; and then fhe will return the very way fhe came, for fear of the wet and dew that hangs on the boughs. In this cafe, the huntfman ought to ftay an hundred paces before he comes to the wood-fide, by which means he will perceive whether fhe returns as aforefaid, which if fhe do, he muft halloo in his hounds, and call them back, and that prefently, that the hounds may not think it the counter fhe came firft.

The next thing that is to be obferved, is the place where the hare fits, and upon what wind fhe makes her form, either upon the north or fouth wind; fhe will not willingly run into the wind, but run upon a-fide, or down the wind; but if fhe form in the water, it is a fign fhe is foul and meafled: if you hunt fuch a one, have a fpecial regard all the day to the brook-fides, for there, and near plafhes, fhe will make all her croffings, doublings, &c.

Some hares have been fo crafty, that as foon as they have heard the found of a horn, they would inftantly ftart out of their form, tho' it was at the diftance of a quarter

a quarter of a mile, and go and ſwim in ſome pool, and reſt upon ſome ruſh bed in the midſt of it; and would not ſtir from thence till they have heard the horn again, and then have ſtarted out again, ſwimming to land, and have ſtood up before the hounds four hours before they could kill them, ſwimming and uſing all ſubtilties and croſſings in the water. Nay, ſuch is the natural craft and ſubtilty of a hare, that ſometimes, after ſhe has been hunted three hours, ſhe will ſtart a freſh hare, and ſquat in the ſame form. Others having been hunted a conſiderable time, will creep under the door of a ſheep coat, and there hide themſelves among the ſheep; or when they have been hard hunted, will run in among a flock of ſheep, and will by no means be gotten out from among them, till the hounds are coupled up and the ſheep driven into their pens. Some of them (and that ſeems ſomewhat ſtrange) will take the ground like a coney, and that is called, *going to the vault*. Some hares will go up one ſide of the hedge, and come down the other, the thickneſs of the hedge being the only diſtance between the courſes. A hare that has been ſorely hunted, has got upon a quickſet hedge, and ran a good way upon the top thereof, and then leapt off upon the ground. And they will frequently betake themſelves to furz-buſhes, and will leap from one to the other, whereby the hounds are frequently in default.

Having found where a hare hath relieved in ſome paſture or corn-fields, you muſt then conſider the ſeaſon of the year, and what weather it is; for if it be in the ſpring-time or ſummer, a hare will not then ſet in buſhes, becauſe they are frequently infeſted with piſmires, ſnakes, and adders; but will ſet in cornfields, and open places. In the winter-time, they ſet near towns and villages, in tufts of thorns and brambles, eſpecially when the wind is northerly or ſoutherly. According to the ſeaſon and nature of the place where the hare is accuſtomed to ſit, there beat with your hounds, and ſtart her; which is much better ſport than trayling of her from her relief to her form.

After the hare has been ſtarted, and is on foot, then ſtep in where you ſaw her paſs, and halloo in your hounds, until they have all undertaken it, and go on with it in full cry; then recheat to them with your horn, following fair and ſoftly at firſt, making not too much noiſe either with horn or voice; for at the firſt, hounds are apt to overſhoot the chace through too much heat. But when they have run the ſpace of an hour, and you ſee the hounds are well in with it, and ſtick well upon it, then you may come in nearer with the hounds, becauſe by that time their heat will be cooled, and they will hunt more ſoberly. But, above all things, mark the firſt doubling, which muſt be your direction for the whole day; for all the doublings that ſhe ſhall make afterwards will be like the former, and according to the policies that you ſhall ſee her uſe, and the place where you hunt, you muſt make your compaſſes great or little, long or ſhort, to help the defaults, always ſeeking the moiſteſt and moſt commodious places for the hounds to ſcent in.

To conclude; thoſe who delight in hunting the hare, muſt riſe early, leſt they be deprived of the ſcent of her foot-ſteps.

Hart or Stag-HUNTING. Geſner, ſpeaking of hart-hunting, obſerves, that this wild, deceitful, and ſubtile beaſt frequently deceives its hunter, by windings and turnings. Wherefore, the prudent hunter muſt train his dogs with words of art, that he may be able to ſet them on, and take them off again at pleaſure.

Firſt of all, he ſhould encompaſs the beaſt in her own layer, and ſo unharbour her in the view of the dogs, that ſo they may never loſe her ſlot or footing. Neither muſt he ſet upon every one, either of the herd, or thoſe that wander ſolitatary alone, or a little one, but partly by ſight, and partly by their footing and fumets, make a judgment of the game, and alſo obſerve the largeneſs of his layer. The huntſman, having made theſe diſcoveries in order to the chace, takes off the couplings of the dogs, and ſome on horſeback, the others on foot, follow the cry, with the greateſt art, obſervation, and ſpeed, remembering and intercepting him in his ſubtile turnings and headings; with all agility leaping hedges, gates, pales, ditches: neither fearing thorns, down hills nor woods, but mounting freſh horſe, if the firſt tire; follow the largeſt head of the whole herd, which muſt be ſingled out of the chace; the dogs perceiving, muſt follow; not following any other. The dogs are animated to the ſport by the winding of horns, and the voices of the huntſmen.

But fomtimes the crafty beaft fends forth his little fquire to be facrificed to the dogs and hunters, inftead of himfelf, lying clofe the mean time. In this cafe, the huntfman muft found a retreat, break off the dogs, and take them in, that is, leam them again, until they be brought to the fairer game; which rifeth with fear, yet ftill ftriveth by flight, until he be wearied and breathlefs. The nobles call the beaft a wife hart, who, to avoid all his enemies, runneth into the greateft herds, and fo brings a cloud of error on the dogs, to obftruct their farther purfuit; fometimes alfo beating fome of the herd into his footings, that fo he may the more eafily efcape, by amufing the dogs. Afterwards he betakes himfelf to his heels again, ftill running with the wind, not only for the fake of refrefhment, but alfo becaufe by that means he can the more eafily hear the voice of his purfuers, whether they be far from him, or near to him. But at laft being again difcovered by the hunters and fagacious fcent of the dogs, he flies into the herds of cattle, as cows, fheep, &c. leaping on a cow or ox, laying the fore parts of his body thereon, that fo touching the earth only with his hinder feet, he may leave a very fmall or no fcent at all behind, for the hounds to difcern. But their ufual manner is, when they fee themfelves hard befet, and every way intercepted, to make force at their enemy with their horns, who firft comes upon him, unlefs they be preventing by fpear or fword. When the beaft is flain, the huntfman with his horn windeth the fall of the beaft, and then the whole company comes up, blowing their horns in triumph for fuch a conqueft; among whom, the fkilfulleft opens the beaft, rewards the hounds with what properly belongs to them, for their future encouragement; for which purpofe the huntfmen dip bread in the fkin and blood of the beaft, to give to the hounds.

It is very dangerous to go in to a hart at bay, of which there two forts, one on land and the other in water. Now if the hart be in a deep water, where you cannot well come at him, then couple up your dogs; for fhould they continue long in the water, it would endanger their furbating or foundering. In this cafe, get a boat, and fwim to him, with dagger drawn, or elfe with rope that has a noofe, and throw it over his horns; for if the water be fo deep that the hart fwims, there is no danger in approaching him; otherwife you muft be very cautious.

As to a land-bay, if a hart be burnifhed, then you muft confider the place; for if it be in a plain and open place, where there is no wood nor covert, it is dangerous and difficult to come in to him; but if he be on a hedge-fide, or in a thicket, then, while the hart is ftaring on the hounds, you may come foftly and covertly behind him, and cut his throat. If you mifs your aim, and the hart turn head upon you, then take refuge at fome tree; and when the hart is at bay, couple up your hounds; and when you fee the hart turn head to fly, gallop in roundly to him, and kill him with your fword.

Directions at the death of a HART *or* BUCK. The firft ceremony, when the huntfman comes in to the death of a deer, is to cry, *ware haunch*, that the hounds may not break in to the deer; which being done, the next is the cutting his throat, and there blooding the youngeft hounds, that they may the better love a deer, and learn to leap at his throat: then the mort having been blown, and all the company come in, the beft perfon, who hath not taken fay before, is to take up the knife that the keeper or huntfman is to lay acrofs the belly of the deer, fome holding by the fore-legs, and the keeper or huntfman drawing down the pizzle, the perfon who takes fay, is to draw the edge of the knife leifurely along the middle of the belly, beginning near the brifket, and drawing a little upon it, enough in the length and depth to difcover how fat the deer is; then he that is to break up the deer, firft flits the fkin from the cutting of the throat downwards, making the arber, that fo the ordure may not break forth, and then he paunches him, rewarding the hounds with it.

In the next place, he is to prefent the fame perfon, who took fay, with a drawn hanger, to cut off the head of the deer. Which being done, and the hounds rewarded, the concluding ceremony is, if it be a ftag, to blow a tripple mort; and if a buck, a double one; and then all who have horns, blow a recheat in concert, and immediately a general whoop, whoop.

Otter-HUNTING is performed with dogs, and alfo with a fort of inftruments, called otter-fpears; with which when they find themfelves wounded, they make to land, and fight with the dogs, and that moft furioufly, as if they were fenfible that

that cold water would annoy their green wounds.

There is indeed craft to be ufed in hunting them; but they may be catched in fnares under water, and by river-fides; but great care muft be taken, for they bite forely and venomoufly; and if they happen to remain long in the fnare, they will not fail to get themfelves free by their teeth.

In hunting them, one man muft be on one fide of the river, and another on the other, both beating the banks with dogs; and the beaft not being able to endure the water long, you will foon difcover if there be an otter or not in that quarter; for he muft come out to make his fpraints, and in the night fometimes to feed on grafs and herbs.

If any of the hounds finds out an otter, then view the foft grounds and moift places, to find out which way he bent his head; if you cannot difcover this by the marks, you may partly perceive it by the fpraints; and then follow the hounds, and lodge him as a hart or deer. But if you do not find him quickly, you may imagine he is gone to couch fomewhere farther off from the river; for fometimes they will go to feed a confiderable way from the place of their reft, choofing rather to go up the river than down it. The perfons that go a hunting otters, muft carry their fpears, to watch his vents, that being the chief advantage; and if they perceive him fwimming under water, they muft endeavour to ftrike him with their fpears, and if they mifs, muft purfue him with the hounds, which, if they be good and perfectly entered, will go chanting and trailing along by the river fide, and will beat every root of a tree, and ofier-bed, and tuft of bull-rufhes; nay, they will fometimes take water, and bait the beaft, like a fpaniel, by which means he will hardly efcape.

Roe-buck-HUNTING is performed divers ways, and very eafily in the woods.

When chafed, they ufually run againft the wind, becaufe the coolnefs of the air refrefhes them in their courfe; therefore the huntfmen place their dogs with the wind: they ufually, when hunted, firft take a large ring, and afterwards hunt the hounds. They are alfo often taken by counterfeiting their voice, which a fkilful huntfman knows how to do by means of a leaf in his mouth. When they are hunted, they turn much and often, and come back upon the dogs directly; and when they can no longer endure, they take foil, as the hart does, and will hang by a bough in fuch a manner; that nothing of them fhall appear above the water but their fnout, and they will fuffer the dogs to come juft upon them before they will ftir.

The venifon of a roe-buck is never out of feafon, being never fat, and therefore they are hunted at any time; only that fome favour ought to be fhown the doe, while fhe is big with fawn, and afterwards till her fawn is able to fhift for himfelf; but fome roe-does have been killed with five fawns in their bellies.

He is not called, by the fkilful in the art of hunting, a great roe-buck, but a fair roe buck; the herd of them is called a bevy: and if he hath not bevy-greafe upon his tail, when he is broken up, he is more fit to be dog's meat than man's meat. The hounds muft be rewarded with the bowels, the blood, and feet flit afunder, and boiled altogether: this is more properly called a dofe, than a reward.

HUNTING-MATCH. The firft thing that is to be confidered by one who defigns to match his horfe for his own advantage, and his horfe's credit, is not to flatter himfelf with the opinion of his horfe, by fancying that he is a fwift, when he is but a flow galloper; and that he is a whole-running-horfe (that is, that he will run four miles without a fob at the height of his fpeed) when he is not able to run two or three. Very probably fome gentlemen are led into this error, by their being miftaken in the fpeed of their hounds, who, for want of trying them againft other dogs that have been really fleet, have fuppofed their own to be fo, when, in reality, they are but of a middling fpeed: and becaufe their horfe, when trained, was able to follow them all day, and upon any hour, to command them upon deep as well as light earths, have therefore made a falfe conclufion, that their horfe is as fwift as the beft; but upon trial againft a horfe that has been rightly trained after hounds that were truly fleet, have bought their experience perhaps full dear. Therefore it is advifeable for all lovers of hunting to procure two or three couple of tried hounds, and once or twice a week to follow after them a train-fcent, and when he is able to top them on all forts of earth, and to endure heats and colds ftoutly, then he may better rely on his fpeed and toughnefs.

That horfe which is able to perform a hare-

hare-chace of five or fix miles brifkly and couragcoufly, till his body be as it were bathed in fweat; and then, after the hare has been killed, in a nipping frofty morning, can endure to ftand till the fweat be frozen on his back, fo that he can endure to be pierced with the cold as well as the heat; and then even in that extremity of cold, to ride another chafe as brifkly and with as much courage as he did the former; that horfe which can thus endure heats and colds, is moft valued by fportfmen. Therefore, in order to make a judgment of the goodnefs of a horfe, obferve him after the death of the firft hare, if the chace has been any thing brifk; if when he is cold, he fhrinks up his body, and draws his legs up together, it is an infallible fign of want of vigour and courage: the like may be done by the flackening of his girths after the firft chace, and from the dulnefs of his teeth, and the dulnefs of his countenance, all which are true tokens of faintnefs, and being tired; and fuch a horfe is not to be relied on, in cafe of a wager.

Here it will not be improper to take notice of the way of making matches in former times, and the modern way of deciding wagers. The old way of trial was, by running fo many train-fcents after hounds, as was agreed upon between the parties concerned, and a bell-courfe, this being found not fo uncertain, but more durable than hare-hunting; and the advantage confifted in having the trains led on earth moft fuitable to the qualifications of the horfes. But now others choofe to hunt the hare till fuch an hour, and then to run this wild-goofe-chace, a method of racing that takes its name from the manner of the flight of wild-geefe, which is generally one after another; fo the two horfes after running of twelvefcore yards, had liberty, which horfe foever could get the leading, to ride what ground he pleafed, the hindmoft horfe being bound to follow him, within a certain diftance agreed on by articles, or elfe to be whipped up by the triers or judges which rode by; and whichever horfe could diftance the other, won the match.

But this chace was found by experience fo inhuman, and fo deftructive to good horfes, efpecially when two good horfes were matched; for neither being able to diftance the other, till both were ready to fink under their riders through weaknefs, oftentimes the match was fain to be drawn, and left undecided, though both the horfes were quite fpoiled.

This brought up the cuftom of train-fcents, which afterwards was changed to three heats, and a ftraight courfe; and that the lovers of horfes might be encouraged to keep good ones, plates have been erected in many places of England. The fewer of thefe before you come to the courfe, if your horfe be fiery and mettled, the better, and the fhorter the diftance, the better. Alfo, above all things, be fure to make your bargain to have the leading of the firft train, and then make choice of fuch grounds where your horfe may beft fhow his fpeed, and the fleeteft dogs you can procure: give your hounds as much law before you as your triers will allow, and then, making a loofe, try to win the match with a wind; but if you fail in this attempt, then bear your horfe, and fave him for the courfe; but if your horfe be flow, but well-winded, and a true fpurred nag, then the more train-fcents you run before you come to the ftraight courfe, the better. But here you ought to obferve to gain the leading of the firft train; which, in this cafe you muft lead upon fuch deep earths, that it may not end near any light ground: for this is the rule received among horfemen, that the next train is to begin where the laft ends, and the laft train is to be ended at the ftarting-place of the courfe; therefore remember to end your laft on deep earths, as well as the firft.

HUNTINGDON, the capital of Huntingdonfhire, fituated on the river Oufe, fifty-fix miles north of London: weft long. 15′, and north lat. 52° 23′.

It fends two members to parliament.

HUQUAM, a province of China, bounded by Honan on the north, and by Quamfi and Canton on the fouth; lying between 25° and 30° of north latitude.

HURA, the SAND-BOX-TREE, in botany, a genus of the monoecia-monadelphia clafs of plants, the male flowers of which are aranged in an imbricated amentum; the antheræ are feffile, and adhere to the amentum; the female flower has neither calyx nor corolla; its ftyle is funnel-fhaped, and the fruit is a capfule confifting of twelve cells, in each of which is contained a fingle feed.

HURDLES, in fortification, twigs of willows or ofiers interwoven clofe together, fuftained by long ftakes, and ufually laden with earth.

Hurdles, called alfo clays, are made in

in the figure of a long square; the length being five or six feet, and the breadth three, or three and an half: the closer they are woven, the better. They serve to render batteries firm, or to consolidate the passage over muddy ditches: or to cover traverses and lodgments, for the defence of the workmen, against the fire-works, or the stones, that may be thrown against them.

Hurdles, in husbandry, certain frames, made either of split timber, or of hazel-rods, wattled together, to serve for gates in inclosures, or to make sheepfolds, *&c.*

HURDS, or **Hords**, *of flax*, or *hemp*, the coarser parts separated in the dressings, from the tear or fine stuff.

HURLE-BONE, in a horse, a bone near the middle of the buttock, very apt to go out of its sockets with a hurt or strain.

HURLERS, a number of large stones set in a square figure, near St. Clare, in Cornwal, so called from an odd opinion held by the common people, that they are so many men petrified, or changed into stones, for profaning the sabbath-day, by hurling the ball, an exercise for which the people of that county have been always famous. The hurlers are oblong, rude, and unhewed. Some suppose them to have been trophies erected in memory of some battle; others take them for boundaries, to distinguish lands; and others hold them to be sepulchral monuments.

HURON, a vast lake of north America, situated between 84° and 89° west long, and between 43° and 46° north lat. from whence the country contiguous to it is called the country of the Hurons, whose language is spoken over a great extent in the southern parts of north America. See the article Algonquin.

HURRERS, a name formerly given to the cappers and hat-makers of London.

HURRICANE, a furious storm of wind, owing to a contrariety of winds. See the article Wind and Whirlwind.

Hurricanes are frequent in the West-indies, where they make terrible ravages, by rooting up trees, destroying houses and shipping, and the like.

The natives, it is said, can foretel hurricanes by the following prognostics: 1. All hurricanes happen either on the day of the full, change, or quarter of the moon. 2. From the unusual redness of the sun, the great stillness and at the same time turbulence of the skies, swelling of the sea, and the like, happening at the change of the moon, they conclude there will be a hurricane next full-moon; and if the same signs be observed on the full moon, they may expect one next new-moon.

As to the cause of hurricanes, they undoubtedly arise from the violent struggle of two opposite winds. Now as the wind betwixt the tropics is generally easterly, and upon the sun's going back from the northern tropic, the western winds pour down with violence upon those parts, the opposition of these contrary winds cannot fail to produce an hurricane.

Hurricanes shift not through all the points of the compass, but begin always with a north wind, veer to the east, and then cease; and their shifting between these two points is so sudden and violent, that it is impossible for any ship to veer with it; whence it happens that the sails are carried away, yards and all, and sometimes the masts themselves wreathed round like an osier.

HUSBAND, *maritus*, a man joined or contracted with a woman in marriage.

By marriage the husband has power over his wife's person; but if he threaten to kill her, *&c.* she may make him find surety of the peace: he has likewise power over the wife's estate; and if she have fee, he gains a freehold in her right. He also gains her chattles real, as terms for years, *&c.* and all personal chattels in the possession of the wife, are the husband's; but where the wife is out of possession, or the chattels are debts, or things in action, in case they are not recovered by him and his wife, the husband shall not be entitled to have them. A husband cannot alien the lands of his wife, only by fine wherein she joins; or make leases of her estate, but where she is made a party, and the rent reserved to husband and wife, and the heirs of the wife, *&c.* nor shall the wife's own acts, as to her estate, bind even herself without a fine levied, when she is examined by writ, if she does it freely, *&c.*

The husband shall be tenant by the courtesy of his wife's land, after her death, where issue is born between them; and the wife shall have dower in her husband's lands, after his decease; also her necessary apparel, *&c.* and if she survives the husband, she shall have her terms for years, or chattels real, again, where the husband has not altered the property: yet in a husband's life-time the wife is disabled to make any contract without his con-

consent, unless it is for necessaries according to his degree and estate; and notwithstanding she may use the goods of her husband, she may not dispose of, or pawn them; though, if she take them away, it is not felony in her. As a husband is not obliged by his wife's contract, without notice and assent; so he is not bound by the receipt of his wife, for his money. Although a wife be very lewd, if she lives with her husband, he is chargeable for all necessaries for her; and so he is in case he runs away from her, or turns her away. It is otherwise if she goes away from the husband: then, as soon as such separation is notorious, whoever gives her credit, does it at his peril, and her husband is not liable, unless he takes her again; though here, if the husband receives her, or comes after her, and lies with her but one night, that may make him chargeable for her debts.

HUSBANDRY, denotes much the same with agriculture. See AGRICULTURE. As there is no subject of more general advantage than the cultivation of lands, we have given the operations and improvements thereof, under a great variety of articles, as PLOWING, FALLOWING, INCLOSURE, DRAINS, HEDGE, DITCH, SOWING, HOEING, CORN, PASTURE, HAY, &c.

The New Method of Horse-hoeing Husbandry, written by the ingenious Jethro Tull, has now been published some years, so that a pretty good judgment may be formed of the performance. See the article HOEING.

Every man, who has considered the principles upon which this method of culture is founded, may discern how far his theory is consistent with nature: though, it is probable, few have as yet made sufficient experiments, to be fully informed of its worth. How it has happened, that what proposes such advantages, has been so long neglected in this country, may be matter of surprize to those who are unacquainted with the characters of the men on whom its practice depends; but to those who know them thoroughly, it can be none: for it is certain that very few of them can be prevailed on to alter their usual methods, though their continuing therein, renders them unable to maintain their families and pay their debts: but what is still more to be lamented, those who are averse to improvements, dissuade others also from thinking of them. But as the methods commonly used, together with the mean price of grain, have every where reduced the farmers so low, that they pay their rents very ill, and in many places throw up their farms, the cure of these evils is certainly an object worthy of the public attention: for if the proprietors must be reduced to cultivate their own lands, which cannot be done by the hands of these obstinate and indocile people, it is easy to discern on which side his balance of profit and loss will turn. This consideration, together with many others which might be urged, hath induced us to recommend this treatise to the serious attention of all who wish well to their country; in hopes that some may be prevailed on, from a regard either to the public good or their own interest, to give the method proposed in it a fair and impartial trial; for could it be introduced into several parts of Great Britain, by men of generous and benevolent principles, their example might, in time, establish the practice, and bring it into general use; which is scarce to be expected, by any other means.

It is therefore to such only as are qualified to judge of a theory, from the principles on which it is founded, that we do ourselves the honour to address them, to give this essay an attentive reading, and to try the experiments with proper care. As a motive to this, it is to be observed, that, though the method of culture proposed by Mr. Tull, has made little progress in England, it is not likely to meet with the same neglect abroad, especially in France, where a translation of his book was undertaken at one and the same time, by three different persons of consideration, without the privity of each other; but afterwards two of them put their papers into the hands of the third, M. Du Hamel du Monceau, of the Royal Academy of Sciences at Paris, and of the Royal Society of London, who has published a book, intitled, A treatise on Tillage, on the principles of Mr. Tull. The ingenious author has, indeed, in some measure altered the method observed by Mr. Tull, in his book; yet has very exactly given his principles and rules; but as he had only seen the first edition of the Horse-hoeing Husbandry, so he is very defective in his descriptions of the ploughs and drills, which in that was very imperfect, and was afterwards amended by Mr. Tull, in his additions to that essay. One of the principal reasons for taking notice of this book, is to shew the com-

comparison this author has made between the old method and the new. By his calculation, the profits arising from the new are considerably more than double those of the old. For, according to him, the profits of twenty acres of land, for ten years, amount, at 10½d. per livre.

	liv.	l.	s.	d.
By the old method to	3000, or	131	5	0
By the new method to	7650, or	334	13	9

Which makes a prodigious difference in favour of the latter. As this computation was made by one who cannot be supposed to have any prejudice in favour of Mr. Tull's scheme, it will naturally find more credit with the public, than any comparison made by Mr. Tull himself, or by those who approve his practice.

There have appeared no objections against Mr. Tull's principles or practice, that may not be equally urged against every sort of improvement: one of the principal is, its being impracticable in common fields, without the concurrence of every one who occupies land in the same field. But does not this equally affect the old husbandry? for every such person is obliged to keep the turns of plowing, fallowing, &c. with the other occupiers; so that if any of them were inclinable to improve their lands, by sowing grass-seed, or any other method of culture, they are under the same difficulties as they would be, were they to practice Mr. Tull's method.

Others object, that the introducing this sort of husbandry is unnecessary, since the improvements made by grass-seeds are so very considerable: besides, the returns made by the fold and dairy being much quicker than by grain, they engage the farmer to mix ploughing and grazing together. But this can have no weight; for it is well known, that in the farms where the greatest improvements have been made by grass-seeds, the dressing required for the arable land often runs away with most of the profit of the whole farm, especially when the price of grain is low. If this be the situation of the most improved farms, what must be the case of those which chiefly consist of arable-land, where most of the dressing must be purchased at a great price, and often fetched from a considerable distance. This, together with the great expence in servants and horses, unavoidable in arable farms, shew the advantages the grazier has over the ploughing farmer. It is therefore much to be wished, that the practice of mixing the two sorts of husbandry, were more generally used in every part of the kingdom; and here we apprehend Mr. Tull's method of culture would be the surest way to improve both. For though Mr. Tull chiefly confined the practice of his method to the production of grain, yet it may be extended to every vegetable which is the object of culture in the fields, gardens, and woods; and perhaps may be applied to other crops to equal if not to greater advantage than to corn. In the vineyard it hath been long practised with success; and it may be used in the hop-ground with no less advantage. For the culture of beans, pease, woad, madder, and other large-growing vegetables, and for lucern, saintfoin, and the larger grasses, we conceive it the most profitable method, since in all these crops, one sixth part of the seed now commonly sown, will be sufficient for the same quantity of land, and yet the crop will be much greater. It may also be used with equal advantage in our colonies in America in the culture of sugar-canes, indigo, cotton, and rice.

It has been objected that it is practicable only on such lands as are soft and light, and not at all on stiff or stony ground: but the hoe-plough has been long used in vineyards, where the soil is stronger and abounds with stones full as much as any part of this country; though the use of this plough is attended with some difficulties upon such land, for wheat, or plants of low growth, whose roots may be in danger of being turned out of the ground, or their tops buried by the clods or stones; yet none of the larger growing plants are subject to these inconveniencies. Besides, the stronger the soil is, the more benefit it will receive from this method of culture, if the land be thereby more pulverized; which will certainly be the consequence, where the method laid down by Mr. Tull is duly observed.

But as most instruments, in their first use, are attended with some difficulty, the hoe-plough has been complained of as cumbersome and unweildy both to the horse and ploughman. But it is proper here to observe, that the swing-plough, commonly used in the land about London, will do the business of the hoe-plough in all ground that is not very strong or very stony; and that where it is so, the foot-plough made proportionably

ably ſtrong, will completely anſwer all purpoſes: but then, when theſe are uſed to hoe corn, the board on the left hand of the plough, anſwering the mould-board, muſt be taken off, otherwiſe, ſo much earth will run to the left ſide, as to injure the crop when it is low.

The drills are excellent inſtruments, yet we imagine them capable of farther improvements. Parallel grooves, at about an inch aſunder, round the inſide of the hopper, would ſhew the man who follows the drill, whether or no both boxes vent the ſeed equally. By an hitch from the plank to the harrow, the latter may be lifted to a proper height, ſo as not to be in the way when the ploughman turns at the head-land. Two light handles on the plank, like thoſe of the common plough, would enable the perſon, who follows the drill, to keep it from falling off the middle of the ridge: it may be uſeful alſo in wet weather, to double the drill; by which means two ridges may be ſown at the ſame time, the horſe going between them: for the planks of two drills, each plank having one of the ſhafts fixed to it, may be joined end to end by two flat bars of iron, one on each ſide, well ſecured by iron-pins and ſcrews; and by correſponding holes in the planks and bars, the diſtance between the drills may be altered, according to the different ſpaces between the ridges.

We ſhall now annex a computation of the expence and profit both of the old method of culture and the new, experimentally tried by a gentleman of veracity, in a country where the ſoil was light and chalky, that is, of the ſame nature with that from whence Mr. Tull drew his obſervations. In the new huſbandry, every article is put at its full value, and the crop of each year is four buſhels ſhort of the other; though, in ſeveral years experience, it has equalled, and generally exceeded, thoſe in the neighbourhood in the old way.

An Eſtimate of the Expence and Profit of Ten Acres of Land, in Twenty Years.

I. In the Old Way.

	l. s. d.	l. s. d.
The firſt year for wheat coſts 33 l. 5 s. *viz.*		
Firſt ploughing at 6 s. per acre — — —	3 0 0	
Second and third ditto, at 8 s. per acre, — — —	4 0 0	
Manure, 30 s. per acre, — — —	15 0 0	
		22 0 0
Two harrowings and ſowings, at 2 s. 6 d. per acre, —	1 5 0	
Seed, three buſhels per acre, at 4 s. per buſhel, — —	6 0 0	
Weeding, at 2 s. per acre, — — —	1 0 0	
Reaping, binding, and carrying in, at 6 s. per acre, —	3 0 0	
		11 5 0
		33 5 0
Second year for barley coſts 11 l. 6 s. 8 d. *viz.*		
Once ploughing, at 6 s. per acre, — — —	3 0 0	
Harrowing and ſowing, at 1 s. 6 d. per acre, — —	0 15 0	
Seed, four buſhels per acre, at 2 s. per buſhel, —	4 0 0	
Weeding, at 1 s. per acre, — — — —	0 10 0	
Cutting, raking, and carrying, at 3 s. 2 d. per acre, —	1 11 8	
Graſs-ſeeds, at 3 s. per acre, — — —	1 10 0	
		11 6
		44 11
Third and fourth years, lying in graſs, coſt nothing.		
So that the expence of ten acres in four years comes to 44 l. 11 s. 8 d.		
and in twenty years to — — — —		222 18
Firſt year's produce is half a load of wheat per acre, at 7 l. per acre —		35 0 0
Second year's produce is two quarters of barley per acre, at 1 l. per acre		20 0 0
Third and fourth years graſs is valued at 1 l. 10 s. per acre —		15 0
So that the produce of ten acres in four years, is — —		70 0
And in twenty years it will be — — — —		350 0
Deduct the expence — — — —		222 18
And there remains clear profit on ten acres in twenty years by the old way		127 1

II. [illegible]

II. In the New Way.

	l.	s.	d.	l.	s.	d.
Firft year's extraordinary expence is						
For ploughing and manuring the land, the fame as in the old way				22	0	0
Ploughing once more, at 4s. per acre, — —	2	0	0			
Seed, nine gallons per acre, at 4s. per bufhel, —	2	5	0			
Drilling, at 7d. per acre, — — —	0	5	10			
Hand-hoeing and weeding, at 2s. 6d. per acre, —	1	5	0			
Horfe-hoeing, fix times, at 10s. per acre, — —	5	0	0			
Reaping, binding, and carrying in, at 6s. per acre, —	3	0	0			
The ftanding annual charge on ten acres is — —	13	15	10			
Therefore the expence on ten acres in twenty years is — —				275	16	8
Add the extraordinaries of the firft year, and the fum is —				297	16	8
The yearly produce is at leaft two quarters of wheat per acre, at 1 s. 8 d. per quarter, which on ten acres in twenty years amounts to —				560	0	0
Therefore, all things paid, there remains clear profit on ten acres in twenty years, by the new way — — — —				262	3	4

So that the profit on ten acres of land, in twenty years, in the new way, exceeds that in the old way by 135 l. 1 s. 8 d. an ample encouragement to practice a fcheme, by which fo great an advantage will arife from fo fmall a quantity of land in the compafs of a twenty-one years leafe. It ought alfo to be obferved, that Mr. Tull's hufbandry requires no manure at all, though we have here, to prevent objections, allowed the charge of it for the firft year; and moreover, that though the crop of wheat from the drilling plough is here put only at two quarters on an acre; yet Mr. Tull himfelf, by actual experiment and meafure, found that the produce of his crop of drilled wheat, amounted to almoft four quarters on an acre.

HUSBRECE, the fame with burglary. See the article Burglary.

HUSGABLE, antiently fignified houfe-rent, or fome tax impofed upon houfes.

HUSK, the fame with what botanifts call the calyx, or cup of a flower. See the article Calyx.

Petiver of the verticellate plants, as fage, rofemary, and the like, fays, that it is an erroneous tho' general opinion, that the flowers of thefe plants contain their principal medicinal virtues; the hufks being the part in which this is lodged. Thus, for inftance, the fine fcent of hungary-water is not owing to the flowers but hufks of rofemary; fince the flower alone, when clean picked off them, yields very little odour. See Hungary-water.

HUSO, the isinglass-fish, in ichthyology, the fmooth-bodied accipenfer, a river-fifh larger than the fturgeon, or common accipenfer. See Accipenser.

It is faid to grow to twenty-four feet in length, and is thick in proportion: the roftrum or fnout is long, and furnifhed with cirri; but its mouth is very fmall in proportion to the fize of the fifh, and is furnifhed with no teeth. It has only one ferrated long fin on the back, a pair of pectoral and another of belly-fins, befide that near the anus. It is more frequent in the Danube than in any other part of the world. See plate CXXXV. fig. 4.

The ichthyocolla or ifinglafs of the fhops, famous as an agglutinant, and for fining of wines, is the produce of this fifh, made by boiling down its membranous parts to a jelly. See Ichthyocolla.

HUSSARS, a kind of irregular cavalry, armed with the fabre and bayonet, are retained in the fervice of moft princes on the continent.

They are very refolute partifans, and better in an invafion or hafty expedition, than in a fet battle.

HUSSITES, the difciples of John Hufs, a Bohemian, and curate of the chapel of Bethlehem at Prague; who, about the year 1414, embraced and defended the opinion of Wickliff of England, for which he was cited before the council of Conftance, and, refufing to renounce his fuppofed errors, he was condemned to be burnt alive, which fentence was accordingly executed upon him at Conftance.

It is evident in what the pretended herefy of John Hufs and Jerom of Prague, who fuffered with him, confifted, from the anfwer they made to the council, when they were admonifhed to conform to the fentiments of the church: they were lovers, they faid, of the holy gofpel, and true difciples of Chrift; that the church of Rome, and all other churches of the world, were widely departed from the apoftolical tradition; that the clergy ran after pleafures and riches, lorded it over the people, affected the higheft feats at enter-

entertainments, bred horfes and dogs, and the revenues of the church, which belonged to the poor members of Chrift, were confumed in vanity and wantonnefs; and that the priefts were ignorant of the commandments of God, or if they did know them, paid but little regard to them. The followers of Hufs were alfo called calixtins, taberites, and bohemian brethren.

HUSTINGS, a court held in Guildhall before the lord-mayor and aldermen of London, and reckoned the fupreme court of the city. Here deeds may be inrolled, recoveries paffed, out-lawries fued out, and replevins and writs of error determined. In this court alfo is the election of aldermen, of the four members of parliament for the city, *&c.*

This court is very antient, as appears by the laws of Edward the confeffor.

Some other cities have likewife had a court bearing the fame name, as Winchefter, York, *&c.* See the article COURT.

HUSUM, a port-town of Slefwic or fouth Jutland, fituated on the German fea; fubject to the duke of Holftein Gottorp: eaft long. 8° 30′, north lat. 54° 40′.

HUT, a fmall cottage; alfo a foldier's lodge, otherwife called a cafern. See the article CASERNS.

HUTHERFIELD, a market-town in the weft riding of Yorkfhire: weft long. 1° 34′, north lat. 53° 37′.

HUXING *of a pike*, a method of catching that fifh, performed in the following manner: a perfon takes thirty or forty as large bladders as he can get, blows them up, and ties them clofe together; then at the mouth of each he ties a line, which is longer or fhorter according to the depth of the water; and at the end of the line is faftened a baited hook: they are then put into a pond with the advantage of the wind, that they may gently move up and down the water. When a mafter-pike has fwallowed the hook, and is almoft fpent, he is taken out of the water.

HUY, a ftrong town in the bifhopric of Liege, fituated on the Maes, fixteen miles north-eaft of Namur: eaft long. 5° 15′, north lat. 50° 35′.

HYACINTH, *hyacinthus*, in botany, a genus of the hexandria-monogynia clafs of plants, the flower of which confifts of a fingle companulated petal, divided into fix reflex fegments at the limb: the fruit is a roundifh capfule, lightly ridged with three corners, and divided into three cells, each of which ufually contains two roundifh feeds.

There is a great variety of thefe beautiful flowers, all of which are propagated by feeds, or off-fets from the old bulbs.

HYACINTH, in natural hiftory, a genus of pellucid gems, whofe colour is red with an admixture of yellow.

The hyacinth, tho' lefs ftriking to the eye than any other red gems, is not without its beauty in the fineft fpecimens. It is found of various fizes, from that of a pin's head to the third of an inch in diameter. Like common cryftal, it is fometimes found columnar, and fometimes in a pebble form; and is always hardeft and brighteft in the larger maffes.

Its colour is a dull or deadifh red, with an admixture of yellow in it; and this mixed colour is found in all the variety of tints, that a prevalence of the red or of the yellow in different degrees is capable of giving it.

Our jewellers allow all thofe gems to be hyacinths or jacinths, that are of a due hardnefs with this mixed colour; and as they are of very different beauty and value in their feveral degrees and mixture of colours, they divide them into four kinds; three of which they call hyacinths, but the fourth, very improperly a ruby. 1. When the ftone is in its moft perfect ftate, and of a pure and bright flame-colour, neither the red nor the yellow prevailing, in this ftate they call it hyacintha la belle. 2. When it has an over-proportion of the red, and that of a dufkier colour than the fine high red in the former, and the yellow that appears in a faint degree in it, is not a fine, bright, and clear, but a dufky brownifh-yellow, then they call it the faffron hyacinth. 3. Such ftones as are of a dead whitifh yellow, with a very fmall proportion of red in them, they call amber-hyacinths. And, 4. When the ftone is of a fine deep red, blended with a dufky and very deep yellow, they call it a rubacelle. But tho' the over-proportion of a ftrong red in this gem has made people refer it to the clafs of rubies, its evident mixture of yellow, fhews that it truly belongs to the hyacinths.

The hyacinth la belle is found both in the Eaft and Weft Indies. The oriental are the harder, but the american are often equal to them in colour. The rubacelle

bacelle is found only in the Eaſt Indies, and is generally brought over among the rubies, but it is of little value: the other varieties are found in Sileſia and Bohemia.

Our druggiſts uſually keep under the names of hyacinths, ſmall garnets, ſome of them of the ſmooth pebble-kind, ſomewhat reſembling the native rubies, and others angular. They have the former from Poland, the latter principally from Bohemia: but neither of them are true hyacinths. They have ſometimes, tho' rarely, the third kind, or amber-hyacinths; and if any ſtreſs were to be laid on the virtues of this ſtone, theſe are the only kind that can lay any claim to it. They have alſo a very ſmall and bad kind of the amber-hyacinth, whiter than thoſe received among the jewellers, which are found in the beds of rivers in Bohemia; theſe, they would perſuade us, are true oriental hyacinths, but beſide our knowing that the ſame are found in Bohemia, the want of hardneſs in the very fineſt of them, is an evident proof of the contrary.

The antients have attributed great virtues to this gem; and later writers have even made it the baſis of a cordial and aſtringent confection, which takes its name from it. It is generally ſaid to be cordial, reſtorative, and moderately aſtringent; and ſome have added that it is hypnotic. But the oſtentation of bringing the moſt coſtly things into medicines, rather than any rational opinion of their virtues, ſeems to have given the original hint of introducing the gems into it; and if there were nothing elſe againſt it, one would be cautious of their getting into uſe, were it only from the uncertainty of what apothecaries meet with under their names at the druggiſts.

HYACINTHIA, an antient grecian feſtival, obſerved at Amyclæ in Lanconia, in the month Hecatombæon, in memory of the beautiful young Hyacinthus, ſon of Amyclos king of Sparta. It continued three days, during the firſt of which they ſhewed all imaginable ſigns of grief for the death of Hyacinthus: upon the ſecond and third day, various ſpectacles were exhibited, and hymns ſung in honour of Apollo: they likewiſe offered multitudes of victims, and gave rich entertainment to their friends.

HYADES, in aſtronomy, ſeven ſtars in the bull's head, famous among the poets for the bringing of rain.

The principal of them is in the left eye, called by the Arabs Aldebaran. See the articles TAURUS and ALDEBARAN.

HYÆNA, in zoology, a ſpecies of canis, with the hairs of the neck long and erect. See the article CANIS.

This is a very ſingular and a very ugly animal; it is of the bigneſs of a bull-dog; the head is large and ſhort; the noſe obtuſe; the mouth wide, and furniſhed with a terrible armature of teeth; the eyes are large, black, and of a very fierce aſpect; the ears are ſhort, broad, and erect; the neck is very thick, and covered with a kind of briſtles inſtead of hairs, which naturally ſtand erect, and give a very formidable appearance to the creature; the body is bulky and rounded, and the ſhape not unlike that of a pig; the legs are moderately long, and very robuſt; the general colour is a very duſky-olive, approaching to black; the legs are darker, and the face paler, than the reſt: it is a native of many parts of the eaſt, and is an extremely fierce and voracious animal: it is not very ſwift, but is continually lying in wait for other creatures, and ſcarce any thing that comes in its way eſcapes it: its voice is ſhrill, and has a mournful ſound.

HYALINA, in natural hiſtory, a genus of foſſils, conſiſting of talcs, compoſed of very broad and ſingle flakes, each of conſiderable thickneſs, reſembling plates, of glaſs, and not fiſſile into thinner ones. Of this genus there is only one known ſpecies, *viz.* the brown hyalina, being an extremely pure and very regularly formed body, of a moſt equally laminated ſtructure, and found in maſſes from three to twenty-four inches in diameter; theſe are always flat, very ſmooth, and polite, as if newly ſplit on their horizontal ſurfaces; and very rugged, notched, and chopped on their lateral ones: it ſeldom exceeds four or five inches in thickneſs, even in the largeſt maſſes. See the article TALC.

HYBRIS, in grecian antiquity, a denomination given to a ſilver ſtool placed in the aræopagus, on which the plaintiff or accuſer ſtood; as that on which the defendant or perſon accuſed ſtood, was called anædeia.

Here the plaintiff propoſed three queſtions to the party accuſed, to which poſitive anſwers were to be given. The firſt was, are you guilty of this fact? The ſecond, how did you commit the fact? The third, who were your accomplices?

HYDATIDES, in medicine, little tranſparent

ſparent veſicles or bladders, full of water, ſometimes found ſolitary, and ſometimes in cluſters, upon the liver, and various other parts, eſpecially in hydropical conſtitutions.

But in a particular ſenſe, the hydatis is a diſeaſe of the eye-lids, called alſo aquula. St. Yves informs us, that there ſometimes comes on the edge of the cartilages of the eye-lids, or on the conjunctiva, an elevation like the bladders which appear on the ſkin after burns. They are as big as a pea, or a lentil; are filled with a very clear liquor, and have the name of hydatides from the lymph which they contain. Sometimes a feroſity is extravaſated between the conjunctiva and the membrane which covers it: it ſeparates theſe membranes, and in the movement of the eye, a ſort of wrinkle appears, which ſhews that a ſeroſity ſtagnates between theſe membranes, and produces the ſwelling. This diſeaſe is not at all dangerous; it is a little troubleſome when it ſeizes only part of the conjunctiva. The ſureſt remedy is to prick it dextrouſly with the point of a lancet, and to lay it open according to the longitudinal direction of the tumour, without any other application.

HYDATOIDES, the ſame with the aqueous humour of the eye. See EYE.

HYDATOSCOPIA, called alſo hydromancy, a kind of divination or method of foretelling future events by means of water. See HYDROMANCY.

HYDE, or HIDE. See the article HIDE.

HYDNUM, in botany, a genus of fungi, called by ſome erinaceus: it is an horizontal fungus, echinated, or beſet with ſharp pointed fibres on its under part. See the article FUNGUS.

HYDRA, in aſtronomy, a ſouthern conſtellation imagined to repreſent a water-ſerpent.

The number of ſtars in this conſtellation in Ptolemy's catalogue is 25, and in the britannic catalogue, 68.

HYDRAGOGUES, ὑδραγωγα, among phyſicians, remedies which evacuate a large quantity of water in dropſies. See the article DROPSY.

Quincy obſerves, that the ſtrongeſt cathartics chiefly anſwer to the character of hydragogues, in that by their forcibly ſhaking and vellicating the bowels, and their appendages, they ſqueeze out water enough to make the ſtools appear little elſe. The principal hydragogues, in the common opinion, are the juices of elder, or the root of iris, of ſoldanella, mechoacan, jalap, &c. In the general, all ſudorific, aperitive, and diuretic medicines are truly hydragogues.

HYDRANGEA, in botany, a genus of the decandria-digynia claſs of plants; the corolla whereof conſiſts of five equal, roundiſh petals, greater than the cup: the fruit is a roundiſh didymous capſule; the two permanent ſtyles make two beaks to it, and is rendered angular by many ribs: it is coronated by the cup, and divided into two cells by a tranſverſe membrane: the ſeeds are numerous, angular, acuminated, and very ſmall.

HYDRARGYRUM, a name given to mercury or quickſilver. See the article MERCURY.

HYDRAULICS, the ſcience of the motion of fluids, and the conſtruction of all kinds of inſtruments and machines relating thereto.

The laws of the motion of fluids, and the cauſes of their deſcent or riſe below or above the common ſurface or level of the ſource or foundation, have been already delivered under the article fluid: and the art of conducting fluids into pipes, canals, drains, &c. as alſo the art of raiſing them, with the ſeveral machines employed for that purpoſe, as ſyphons, pumps, ſyringes, fountains, fire engines, mills, &c. are deſcribed under their proper heads. See the articles SYPHON, PUMP, SYRINGE, FOUNTAIN, ENGINE, MILL, &c.

Hydroſtatics explain the equilibrium of fluids at reſt; upon removing which equilibrium motion enſues, and hydraulics commence.

Hydraulics, therefore, ſuppoſe hydroſtatics, and the generality of writers, from the immediate relation between the two, join them together, and call them both either hydraulics or hydroſtatics. See the article HYDROSTATICS.

HYDRELÆUM, in pharmacy, a mixture of common oil with water, which, taken internally, is emetic; but applied externally, is anodyne, and promotes ſuppuration.

HYDRENTEROCELE, in ſurgery, a ſpecies of hernia, wherein the inteſtines deſcend into the ſcrotum, together with a quantity of water. See HERNIA.

HYDROCANISTERIUM, an engine which ſpouts water in great quantities, and to conſiderable heights, in order to extin-

extinguish accidental fires in houses. See the article ENGINE.

HYDROCELE, in surgery, denotes any hernia arising from water, but is particularly used for such a one of the scrotum which sometimes grows to the size of one's head, without pain, but exceeding troublesome to the patient.

Tho' authors, says Sharp, mention several kinds of this disease, there are but two; the first is when the water is contained in the tunica vaginalis; the second, when it is contained in the cellular membrane of the scrotum. This last is always complicated with an anasarca, a kind of dropsy which consists in the extravasation of the water which lodges in the cells of the membrana adiposa. The hydrocele in this case is easily known, for the skin is shining and soft, yielding easily to a slight impression, which will remain pitted some time. The penis is also sometimes prodigiously swelled by the liquor which insinuates into the cellular membrane. There are none of these symptoms in the dropsy of the tunica vaginalis.

In the dropsy of the cellular membrane of the scrotum, some recommend the puncture with a trocar; others, to make small apertures here and there with the point of a lancet; others, to put a small skane of silk through the skin with a needle, and to let it remain as a seton till all the water is drained off. But the two first methods yield very little relief, and the last may be more likely to induce a gangrene. Nor is there occasion for any operation at all, because the cellular membrane of the scrotum, is nothing but a continuation of the membrana adiposa, and therefore scarifications made in the skin of the small of the legs, will effectually empty the scrotum; yet sometimes there falls so great a quantity into the scrotum, that the distension is very painful, threatening a mortification: likewise the prepuce is very often so excessively dilated and twisted, that it hinders the patient from making water. In these cases, there should be an incision made on each side of the scrotum, three inches in length, quite through the skin into the cells which contain the water, and likewise two or three half an inch long in any part of the penis with a lancet or knife.

The dropsy of the tunica vaginalis, is caused by an excessive accumulation of a serosity which is naturally separated in the internal surface of that tunic, in a small quantity, to moisten and lubricate the testicle.

This disorder is not often the effect of any accident. It never diminishes when once begun, but generally continues to encrease, but in some persons not so quick as others. It is tense and smooth, and ceases before or when it arrives at the rings of the abdominal vessels. When the testicle is encreased in size, the tumour is rounder, and, if not attended with an enlargement of the spermatic vessels, the cord may be easily distinguished between the tumour and the abdomen.

As to the cure, the author above-mentioned has found little success from inward medicines or outward applications, and therefore thinks it most adviseable to wait till the tumour becomes troublesome, and then to tap it with a lancet. If the orifice of the skin slips away from that of the tunic, and prevents the egress of the water, you may introduce a probe, and by that means secure the exact situation of the wound. When the tunica vaginalis is very tense, the testicle itself cannot be easily distinguished; but there will be no danger of wounding it, if the inferior part of the scrotum is opened with a lancet not too long. During the evacuation, the scrotum must be regularly pressed; and after the operation, a little piece of dry lint and sticking-plaster are sufficient. This is called a palliative cure, but it now and then proves an absolute one. It is dangerous to attempt a a radical cure by making a large wound, either by incision or caustic, and therefore that method should be discarded.

HYDROCEPHALUS, in surgery, a preternatural distention of the head, to an uncommon size, by a stagnation and extravasation of the lymph, which, when collected within side of the bones of the cranium, the hydrocephalus is then termed internal; as it is external, when retained betwixt the common integuments and the cranium.

The first kind of the disorder is seldom to be met with but in infants; and if it is advanced to any great degree, is a dangerous case, and generally incurable. If the disorder is in its first stage, and but beginning to shew itself, it will be most adviseable, according to Heister, to try what may be done by medicines, such as gentle and repeated purges, to draw the humours downwards, with corroborating medicines, internally; while externally there is applied a large compress dipt

dipt in lime-water and ſpirit of lavender, or hungary water, which compreſs muſt be retained by a proper bandage. See the article BANDAGE.

The external hydrocephalus is diſtinguiſhed by the ſoftneſs of the head and ſkin externally; but in the internal hydrocephalus, the head feels as hard as uſual, and yet it is much more diſtended and inlarged. Though the external hydrocephalus is not without danger, yet it may be much more eaſily cured than the internal, but with the greater difficulty, as it is of a longer ſtanding. According to the ſame author, the cure muſt be attempted as well by internal as external remedies at the ſame time; ſuch as cathartics, diaphoretics, diuretics, attenuating and ſtrengthening medicines for internal uſe: and externally may be applied a compreſs dipped in the fomentation before-mentioned for the internal hydrocephalus. In this caſe the repeated chewing of tobacco in the mouth, to diſcharge the ſeroſities from the head by ſpitting, is adviſeable: ſome foment the head with fumes of burning ſpirit of wine highly rectified, but if all theſe means prove unſucceſsful, recourſe muſt then he had to chirurgical helps, among which you ought firſt to try a bliſter applied behind the ears on the occiput and neck, and if this does not altogether anſwer the intention, you muſt add ſcarification and cupping upon the ſame parts. See the article CUPPING.

HYDROCHARIS, the LITTLE WATER-LILLY, in botany, a genus of the diœcia-enneandria claſs of plants, the male flower of which has a ſpatha, and is compoſed of three large, plain, and roundiſh petals; the female flower is like the male one, only without any ſpatha: the fruit is a coriaceous and roundiſh capſule, conſiſting of ſix cells, in which are contained a great number of very ſmall and roundiſh ſeeds.

HYDROCORAX, the WATER-RAVEN, in ornithology, a ſpecies of buceros, with a ſmall head and bluiſh back.

This bird is about the bigneſs of the common raven, and is a native of Tartary and China; from whence its beak is often brought over to us as a curioſity, on account of its ſize, as being ſeven inches in length, and in the largeſt part, about the middle of the gibboſity, near three inches in diameter.

There is alſo another ſpecies, about the bigneſs of our common crow, the head of which is of a deep greeniſh caſt; but with an admixture of black: the body too is of a greeniſh colour.

HYDROCOTYLE, MARSH-PENNY-WORT, in botany, a genus of the pentandria-digynia claſs of plants, the univerſal corolla of which is uniform in figure, though not in ſituation; and the ſingle corollæ are formed of five ovato-acute, patent petals: the fruit is orbicular, erect, and compoſed of two compreſſed and ſemi-orbicular ſeeds.

This plant is common with us in damp places, and is ſuſpected of hurting ſheep that feed on it; whence it is ſometimes called white-rot. See the article ROT.

HYDROGRAPHY, ὑδρογραφια, the art of meaſuring and deſcribing the ſea, rivers, lakes, and canals.

With regard to the ſea, it gives an account of its tides, counter-tides, ſoundings, bays, gulphs, creeks, &c. as alſo of the rocks, ſhelves, ſands, ſhallows, promontories, harbours, the diſtance and bearing of one port from another, with every thing that is remarkable, whether out at ſea, or on the coaſt.

HYDROMANCY, a method of divination by water, practiſed by the antients in this manner. They filled a cup or bowl of water: then faſtening a ring to a piece of thread tied to their finger, held it over the water, and repeated a certain form of words, deſiring to be ſatisfied with regard to their enquiry; and if the queſtion was anſwered in the affirmative, the ring would ſtrike the ſides of the bowl of its own accord.

Another kind of hydromancy was to look upon the water in which the figure of ſeveral dæmons uſed to appear. This expedient Numa is ſaid to have made uſe of, to ſettle the ceremonies of religion.

This way of divination is ſaid to have been uſed firſt by the Perſians, and afterwards approved by Pythagoras.

HYDROMEL, among phyſicians, water impregnated with honey, either before or after fermentation.

Vinous hydromel, commonly called mead, is ſaid to be good for the gravel. See the article MEAD.

HYDROMETER, an inſtrument to meaſure the gravity, denſity, velocity, force, &c. of water and other fluids. See the articles WATER and FLUID.

The hydrometer is one of the moſt uſeful inſtruments of the philoſophic kind; for tho' the hydroſtatical balance be the moſt general inſtrument for finding the ſpeci-

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Fig. 1. HYDROMETERS.

N°1. N°2. N°3.

$\frac{1}{10}$ A

$\frac{1}{10}$ B

b C c K

m o
p o
r a
b r
R W
S P
M I
S E
S A

A I K D C B L M

Fig. 2. HYPOTHENUSE.

C B A

Fig. 3. HYDROPHYLLUM.



fic gravities of all forts of bodies, yet the hydrometer is beft fuited to find thofe of fluids in particular, both as to eafe and expedition.

This inftrument fhould be made of copper, fince ivory imbibes fpirituous liquors, and thereby alters its gravity; and glafs is apt to break. The moft fimple kind, ufed for finding the ftrength of fpirits, confifts of a copper-ball B *b* (plate CXXXVII. fig. 1. n° 1.) with a brafs-wire, AB, ¼ of an inch thick, foldered into it. The upper part of this wire being filed flat, on one fide, is marked proof at *m*, becaufe it finks exactly to this mark in proof-fpirits. There are other two marks at A and B, to fhew whether the liquor be $\frac{1}{10}$ above or below proof, according as the hydrometer finks to A or emerges to B, when a brafs-weight as C or K has been fcrewed on at the bottom *c*. There are alfo weights to be fcrewed on, for fhewing the fpecific gravities of fluids quite to common water. The round part of the wire above the ball, may be marked fo as to reprefent river-water when it finks to R W, (*ibid.* n° 2.) the weight which fits the inftrument for river-water being fcrewed on at *c*: alfo when put into fpring-water, mineral-water, fea-water, and water of falt-fprings, it will emerge or rife gradually to the marks S P, M I, S E, S A; and, on the contrary, when put into Briftol-water, rain-water, port-wine, and mountain-wine, it will fucceffively fink to the marks *b r*, *r a*, *p o*, *m o*.

Another kind, which ferves to diftinguifh the fpecific differences of fluids to great nicety, confifts of a large hollow ball B, (*ibid.* n° 3.) with a fmaller ball *b* under it, partly filled with quick-filver or fmall fhot, and fcrewed on to the lower part of the former, in order to render it but little fpecifically lighter than water: it has alfo a fmall fhort neck at C, into which is fcrewed the graduated brafs-wire A C, which by its weight caufes the body of the inftrument to defcend in the fluid, with part of the ftem.

When this inftrument is fwimming in the liquor, contained in the jar I L M K, the part of the fluid difplaced by it, will be equal in bulk to the part of the inftrument under water, and equal in weight to that of the whole inftrument. Suppofe the weight of the whole were 4000 grains, then it is evident we can by this means compare together the different bulks of 4000 grains of various forts of fluids. For if the weight A be fuch as fhall caufe the aræometer to fink in rain-water, till its furface comes to the middle point of the ftem 20; and if, after this, it be immerfed in common fpring-water, and the furface is obferved to ftand $\frac{1}{10}$ of an inch below the middle point 20; it is evident that the fame weight of each water differs in bulk only by the magnitude of $\frac{1}{10}$ of an inch in the ftem.

Now fuppofe the ftem were ten inches long, and weighed 100 grains, then every tenth of an inch would be one grain weight; and fince the ftem is of brafs, and brafs is about eight times heavier than water, the fame bulk of water will be equal to ⅛ of a grain; and confequently to the ⅛ of $\frac{1}{4000}$ part, that is, a 32000th part of the whole bulk, which is a degree of exactnefs as great as can be defired. Yet the inftrument is capable of ftill greater exactnefs, by making the ftem or neck confift of a flat thin flip of brafs, inftead of one that is round or cylindrical: by this means we increafe the furface, which is the moft requifite thing; and diminifh the folidity, by which the inftrument is rendered more exact.

In order to adapt this inftrument to all forts of ufes, there ought to be two different ftems to fcrew on and off in a fmall hole at *a*. One ftem fhould be fuch a nice thin flip of brafs, or rather of fteel, like a watch-fpring fet ftraight, as we have juft mentioned, on one fide of which ought to be the feveral marks or divifions, to which it will fink in various forts of waters, as rain-water, river-water, fpring-water, fea water, falt fpring-water, &c. And on the other fide you mark the divifion to which it finks in various lighter fluids, as hot bath-water, Briftol-water, Lincomb water, Chelten-water, port wine, mountain, madeira, and various other forts of wine. But in this cafe the weight A on the top muft be a little lefs than before, when it was ufed for the heavier waters.

But, in cafe of trying the ftrength of fpirituous liquors, a common cylindric ftem will do beft, becaufe of its ftrength and fteadinefs; and this ought to be fo contrived that, when immerfed in what is called proof fpirit, the furface of the fpirit may be upon the middle point 20; which is eafily done by duly adjufting the fmall weight A on the top, and making the ftem of fuch a length that, when immerf-ed

ed in water, it may juſt cover the ball, and riſe to *a*; but, when immerſed in pure ſpirit, it may ariſe to the top at A; then by dividing the upper and lower parts *a* 20, A 20, into ten equal parts each, when the inſtrument is immerſed in any ſort of ſpirituous liquor, it will immediately ſhew how much it is above or below proof.

This proof-ſpirit conſiſts of half water and half alcohol, or pure ſpirit, that is, ſuch as when poured upon gunpowder, and ſet on fire, will burn all away, and permit the powder to take fire, which it will, and flaſh as in the open air. But if the ſpirit be not ſo highly rectified, there will remain ſome phlegm or water, which will make the powder wet, and unfit to take fire. This proof-ſpirit of any kind, weighs ſeven pounds twelve ounces per gallon.

The common method of ſhaking the ſpirits in a vial, and by raiſing a crown of bubbles, to judge by the manner of their riſing or breaking away whether the ſpirit be proof or near it, is very precarious, and capable of great fallacy. There is no way ſo eaſy, quick, certain, and philoſophical, as this by the aræometer, which will demonſtrate infallibly the difference of bulks, and conſequently ſpecific gravities, in equal weights of ſpirits, to the 30, 40, or 50 thouſandth part of the whole, which is a degree of accuracy, beyond which nothing can be deſired.

HYDROMETRY, ὑδρομετρια, a term ſometimes, though rarely, uſed to denote the menſuration of fluids, their gravity, velocity, *&c.* and conſequently comprehending both hydraulics and hydroſtatics. See HYDRAULICS and HYDROSTATICS.

HYDROMPHALUS, in medicine and ſurgery, a tumour in the navel, ariſing from a collection of water.

The hydromphalus is diſtinguiſhed from other tumours of the navel by its being very ſoft, and yet not tractable and obedient to the touch, ſo as to diminiſh or enlarge by compreſſing it. See the article EXOMPHALUS.

When viewed, placed between the eye and the light, the hydromphalus is found tranſparent. It is to be diſcuſſed by emollient and reſolutive medicines. It is alſo cured by a puncture made in the middle of the navel.

HYDROMYSTES, a name antiently given to certain officers in the greek church, whoſe buſineſs was to make holy-water, and ſprinkle it on the people. See the article HOLY-WATER.

HYDROPARASTATÆ, a ſect of heretics, the followers of Tatian.

This ſect were called alſo encratitæ, apotactitæ, ſaccophori, ſeveriani, and aquarians.

The hydroparaſtatæ were a branch of the manichees, whoſe diſtinguiſhing tenet was that water ſhould be uſed in the euchariſt inſtead of wine.

HYDROPHANÆ, in natural hiſtory, a genus of ſemi-pellucid gems, compoſed of cryſtal and earth; the latter ingredient being in large proportion, and mixed imperfectly, as in the chalcedony; and giving a general cloudineſs or miſtineſs to the ſtone, but of ſo imperfect and irregular an admixture, as not to be capable of ſo good a poliſh as the chalcedony; and appearing of a duſky and foul ſurface, till thrown into water, in which they become lucid, and in ſome degree tranſparent, either in part or totally; alſo changing their colour, which returns to them on being taken out of the water.

To this genus belong the oculus beli of authors, or whitiſh-grey hydrophanes, variegated with yellow, and with a black central nucleus; and the oculus mundi, or lapis mutabilis, which is likewiſe a whitiſh-grey kind without veins.

HYDROPHOBIA, ὑδροφοϐια, in medicine, an averſion or dread of water; a terrible ſymptom of the rabies canina.

This diſeaſe generally proceeds from the bite of a mad dog, and almoſt always ariſes from the infection communicated by the bite of a mad animal; yet it has been obſerved to ariſe ſpontaneouſly in ſome animals affected with acute diſeaſes; and we have an inſtance in the medical eſſays by Dr. Innes at Edinburgh, of a young man that had this ſymptom attending an inflammation of the ſtomach. Almoſt all kinds of animals may be afflicted with this diſorder, and may infect other animals, and even men, as dogs, cats, wolves, foxes, horſes, aſſes, mules, horned cattle, hogs, monkies, and cocks; but it moſt frequently attacks dogs, wolves, and foxes, without any previous contagion.

A hot climate; exceſſive heats and ſudden colds; a long, hot, and dry ſeaſon; feeding much upon putrid, ſtinking, verminous fleſh; want of water; worms generated in the kidneys, guts, brains, or noſtrils, are the preceding cauſes of madneſs

madneſs in theſe animals. When they are going to run mad, they appear dejected, ſhun company, and hide themſelves: they will not bark, but ſeem to mutter or murmur, and are averſe to food and water; they will fly upon ſtrangers, but retain ſome regard for their maſter: their ears and tails hang down, and they walk along as if they were ſleepy. This is the firſt degree of the diſeaſe; and though the bite is then bad, it is not at the worſt. Afterwards, they begin to pant, hang out their tongues, froth at the mouth, and gape; ſometimes they ſeem dull and half aſleep; ſometimes they will run, but not directly forward, and ſoon ceaſe to know their maſters; their eyes are dejected, look watry and duſty; their tongues are of a lead-colour; they fall away ſuddenly, and grow raging mad. A bite at this time is incurable, and the nearer they are to death, with the more dreadful ſymptoms it is attended.

There is ſcarce any poiſon infectious ſo many ways as this, for it takes effect thro' the cloaths, without fetching blood; by the breath of the animal drawn into the lungs; by a touch of the froth, if recent; by handling the wound, or inſtrument which was the death of the animal; or by handling things which have been infected by any of the former means. Again, there is ſcarce any poiſon which produces ſuch terrible effects, and cauſes ſuch a wonderful change in the perſon infected. When it begins to work, it is moſt violent and quick; and yet, as it is ſaid, will lie dormant for twenty years together before it exerts itſelf. This diverſity depends upon the heat of the ſeaſon, the degree of the diſeaſe in the infected animal, and the temperature of the perſon bit; for the bilious are ſooner affected with it, the phlegmatic and hydropic the leaſt: likewiſe ſomething may be attributed to the way of living, diet, and medicines.

A healthy man infected with this contagion, according to Boerhaave, finds the effects of it diſcover themſelves in the following order: there is a pain in the place where he was bit or received the contagion, and then wandering pains in the other parts, chiefly thoſe that are near it; a laſſitude, heavineſs, liſtleſſneſs of the whole body; unquiet troubled ſleep, and terrible dreams, with convulſions and ſubſultus of the tendons; continual inquietude, ſighs, ſadneſs, love of ſolitude: thus ends the firſt degree of the diſeaſe. Afterwards all the ſymptoms encreaſe with a prodigious ſtraitneſs and oppreſſion about the præcordia; a difficult ſighing, reſpiration, horror, a ſhaking and trembling at the ſight of any liquid, pellucid things; a loſs of appetite; an incredible anxiety; trembling and terrible convulſions, almoſt forcing the patient into a rage when any liquid is touched with the lips or tongue; then a vomiting of dark, bilious, viſcid matter, or porraceous bile; an increaſed heat; a fever, continual watching, a priapiſm, a confuſed ſeries of wild and extravagant thoughts: here the ſecond degree of the diſeaſe may be ſaid to terminate. Now all the ſymptoms grow worſe and worſe: the tongue hangs out, and is rough; the voice is hoarſe; ſtrange horrors, ſtarting and wild looks at the ſight of water; a frothing at the mouth; a voluntary inclination to ſpit at the by-ſtanders; alſo to bite them; the patient foams at the mouth, gnaſhes with the teeth, and would do miſchief if not forcibly held. His pulſe and breathing fail; there is a cold ſweat; the higheſt fury: yet during all this time, which is wonderful, the patient continues in his ſenſes, and is afraid of doing harm. On the fourth day from the firſt degree of the diſeaſe, the patient falls into convulſions with great difficulty of breathing, and then dies.

The prevention and cure of this diſeaſe, except in a few inſtances, are very doubtful and uncertain. The preventive cure, according to Boerhaave, conſiſts in making deep ſcarifications, as ſoon as poſſible, after the bite, in the part affected and thoſe adjacent to it, that they may make a conſiderable diſcharge of blood; and then applying large cupping-glaſſes thereon; or it may be burnt pretty deep with an actual cautery. Then it ſhould be made to ſuppurate by ſome corroſive application proper for that purpoſe; and during all that time, it ſhould continually be fomented with a pickle made with vinegar and ſalt: this ſhould be continued for ſix months at leaſt: the garments he had on at the time of the bite ſhould be cautiouſly laid aſide, or deſtroyed. He ſhould likewiſe, with all convenient ſpeed, be dipt in a river, or the ſea, making him believe that he is going to be drowned: this is to be often repeated; for the effect conſiſts in terrifying the mind, and not in the ſalt water, as is commonly ſuppoſed: then he ſhould be often and ſtrongly purged with rhubarb,

bath, agaric, and the juice of elder-bark. He ſhould be put into a ſweat every morning faſting, with a mixture of aromatic vinegar, ſea-ſalt, and hot water: his feet and hands ſhould alſo be daily fomented in a warm bath, and he ſhould waſh his head, mouth, and fauces. Let him often drink cold water, and throw it up again, by vomiting; and let his drink be acidulated. His aliment ſhould be moſt light and laxative, and often taken in ſuch a quantity as to vomit it up again. He ſhould likewiſe abſtain from things that are too ſpicy, from wine, from heating things, from violent exerciſes, and from commotions of the mind.

The cure ſhould be attempted when the diſeaſe is in the firſt degree; and, in the beginning of the ſecond, by treating it as highly inflammatory; by letting blood from a large orifice even to a deliquium; by giving clyſters ſoon after with nitrous or moderately ſalt water, thus: take barley water, ten ounces; nitre, two drams; elder vinegar and honey of roſes, each an ounce: make a clyſter. Or take rue-water, ten ounces; ſea-ſalt, two drams; vinegar impregnated with marygold-flowers, ſix drams; common honey, an ounce: make a clyſter.

Theſe may be repeated boldly, and with leſs caution than in other caſes. After this let the patient be blindfolded, and thrown into a pond of cold water; or let cold water be thrown upon him, till the dread of it almoſt ceaſes: then let a large quantity be forced down his throat; let this be his treatment daily, and at night let ſleep be procured.

Hoffman's ſentiments on this head are greatly different from thoſe of Boerhaave. The antients, ſays he, were of opinion, that all poiſons were of a cold nature, becauſe they obſerved that a more free afflux of blood to the external parts was reſtrained by ſpaſms, for which reaſon they preſcribed heating things, and particularly generous wines, as an univerſal antidote: theſe Celſus ſeems to have followed; and informs us, that the practice of old was to put the patient into a bath, and to make him ſweat as long as his ſtrength would permit, at the ſame time keeping the wound open, that the virus might be diſcharged from it; and then to give him plenty of good generous wine: this being done for two or three days, they judged him out of danger. This practice of the antients, Hoffman thinks moſt effectual, and condemns immerſion in cold water, &c. as Boerhaave does the practice of adminiſtring acrid and heating medicines.

This may give ſome light into the nature of the pulvis antilyſſus publiſhed by Dr. Mead, and received into the diſpenſatory of the college, wherein pepper is one of the ingredients. Take of the powder of aſh-coloured liverwort, four drams; and of the powder of black pepper, two drams: this powder mixt together, is to be taken in warm milk in the morning faſting for four mornings together. After this the doctor orders the patient to be put into a cold bath, pond or river, for thirty days ſucceſſively, early in the morning, and before breakfaſt: he is to remain in it with his head above water, no longer than a minute.

Dr. Sault, from his own experience, recommends another method of cure by mercurial frictions upon the cicatrices, and the parts adjoining, for three days ſucceſſively, and then every other day: beſides this, he orders the patient to take a dram and a half of Palmarius's powder. Dr. James is of opinion, that a vomit or two of mercurius emeticus flavus would be proper, the doſe of which is from two to eight grains; not omitting the cinnabarine powder, nor going into the cold bath in the morning for a month.

HYDROPHORIA, in grecian antiquity, a ſolemnity held at Athens and Ægina, in memory of thoſe that periſhed in the deluge.

HYDROPHYLLUM, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle campanulated petal, divided into five erect, obtuſe, and emarginated ſegments: the fruit is a globoſe capſule, formed of two valves, and containing only one cell, with a ſingle, roundiſh, and large ſeed. See plate CXXXVII. fig. 3.

HYDROPIC, a dropſical patient; or a perſon ſwelled and bloated with the abundance of water. See DROPSY.

HYDROPOTA, in medicine, a perſon who drinks nothing but water.

It has long been controverted among phyſicians, whether or no the hydropotæ live longer than other perſons.

HYDROPS, in medicine, the ſame with dropſy. See the article DROPSY.

HYDROSCOPE, an inſtrument anciently uſed for the meaſuring of time.

The hydroſcope was a kind of water-clock, conſiſting of a cylindrical tube, con-

conical at bottom: the cylinder was graduated, or marked out with divisions, to which the top of the water becoming successively contiguous, as it trickled out at the vertex of the cone, pointed out the hour.

HYDROSTATICAL BALANCE, a kind of balance contrived for the easy and exact finding the specific gravities of bodies, both liquid and solid.

This instrument is of considerable use in estimating the degree of purity of bodies of all kinds; the quality and richness of metals, ores, minerals, *&c.* The proportion in any mixture, adulteration, or the like: of all which the specific weight is the only adequate measure. The doctrine of the hydrostatical balance is founded on this theorem of Archimedes, that a body heavier than water, weighs less in water than in air, by the weight of as much water as is equal to it in bulk.

We have a new hydrostatical balance, the parts of which are as follow: AB (plate CXXXVIII. fig. 1. n° 1.) is the foot on which it stands; CD is a pillar supporting a moveable brass plate EF, fastened thereto by the screw in the knob *e.* In the end of this plate is fixed an upright piece IK, supporting another plate GH; which slides backwards and forwards thereon, and is moveable every way about it. In the end of this plate, at H, is fixed (by a nut beneath) a wire LM, taped with a fine thread from one end to the other; upon this moves the swan-neck slip of brass NO, to which a very exact balance is hung at the point N; to one of whose scales P is appended the heavy body R, by a fine horse-hair or piece of silk S: the weight of the said body R in the air, is expressed by the weight put into the scale Q to make an equilibrium therewith, which being destroyed by immerging the solid in the fluid TV, contained in the glass WV, is again restored by weights put into the scale P. So that the weights in the scale Q compared with those in the scale P, shew at once the specific gravity of the solid R to that of the fluid TV.

The specific gravity of fluids is readily determined by weighing one and the same solid body in them severally; for since we suppose the balance in equilibrio with the body suspended in the air, the equilibrium will be destroyed when the solid is immersed in the fluid, and must be then restored by weights put into that scale to which the body is appended. These weights will severally express the gravities of an equal bulk of the respective fluids; and consequently they may be thus compared with each other, or all of them with the gravity of common water, as usual, and disposed in a proper table; making water 1.000. See *Table of specific* GRAVITIES.

In the same manner, if divers solids are first weighed in air, and then afterwards immersed in the same fluid, as water, for instance, the equilibrium will be destroyed; which will be restored, as before, by putting in so much weight as is equal to the weight of the same bulk of water; the gravity therefore, of every solid is thus compared with water, and consequently with each other.

But in this, and many other cases, it is required to be very exact in weighing bodies, even beyond what is attainable by the nicest mechanism of this instrument. We shall therefore give the reader an account of an improvement of the common balance in this respect; and it is the more pertinent in this place, as this instrument serves equally for exactness in common as in hydrostatical matters.

The figure of the machine represents the balance in its hydrostatic use, *ibid.* n° 2. We shall first describe the machine, then shew the new contrived artifice for exactness; and, lastly, give an instance of its universal use. VCG is the stand or pillar fixed in the table. From the top at A hangs, by two silken strings, the horizontal piece or bar BB; from which is suspended, by a ring at *i*, the fine beam of a balance *b*, which is kept from descending too low on either side by the gentle springing piece *txyz*, fixed on the supporter M. The harness is annulated at *o*, to shew distinctly the perpendicular position of the examen, by the small pointed index fixed above it.

The strings by which the balance is suspended passing over two pullies, one on each side the piece at A, go down to the bottom on the other side, and are hung over the hook at *v*; which hook, by means of a screw P, is moveable about 1¼ inches backwards and forwards, and therefore the balance may be raised or depressed so much. But if a greater elevation or depression be required, the sliding piece S, which carries the screw P, is readily moved to any part of the square brass-rod VK, and fixed by means of a screw.

The motion of the balance being thus provided for, the rest of the apparatus is

is as follows: H H is a fmall table fixed upon a piece D, under the fcales *d* and *e*, and is moveable up and down in a long flit in the pillar above C, and faftned at any part with a fcrew behind. At the point in the middle of the bottom of each fcale is hung by a fine hook a brafs-wire *a d*, *a c*. Thefe pafs through two holes *m*, *m* in the table; and to the wire *a d* is fufpended a curious cylindric wire *r s*, perforated at each end for that purpofe. This wire *r s* is covered with paper graduated by equal divifions, and is about five inches long.

In the corner of the table at E, is fixed a brafs-tube in which a round wire *b l* is fo adapted as to move neither too hard nor too freely by its flat head I. Upon the lower part of this moves another tube Q, which has friction enough to caufe it to remain in any pofition required; to this is fixed an index T, moving horizontally when the wire *b l* is turned about, and therefore may be eafily fet to the graduated wire *r s*.

To the lower end of the wire *r s* hangs a weight L, and to that a wire *p n* with a fmall brafs ball *g*, about ¼ of an inch in diameter. On the other fide, to the wire *a c*, hangs a large glafs bubble R by a horfe-hair. Let us at prefent fuppofe the weight L taken away, and the wire *p n* fufpended from S: and on the other fide let the bubble R be taken away, and the weight F fufpended in its room at *c*. This weight F we fuppofe to be fuch as will keep in equilibrio with the feveral parts appended to the other fcale, at the fame time that the middle point of the wire *p n* is in the furface of the water in the veffel N. The wire *p n* is to be of fuch a fize, that the length of one inch fhall weigh four grains. Hence it is evident, fince brafs is eight times heavier than water, that for every inch the wire finks in the water, it will become half a grain lighter, and half a grain heavier for every inch it rifes out of the water: confequently, by finking two inches below the middle point, or raifing two inches above it, the wire will become one grain lighter or heavier. And therefore, if when the middle point is at the furface of the water in equilibrio, the index T be fet to the middle point *a* of the graduated wire *r s*, and the diftance on each fide *a r* and *a s* contain a hundred equal parts; then, when in weighing bodies the weight is defired to the hundredth part of a grain, it may be eafily had by proceeding in the following manner.

Let the body to be weighed be placed in the fcale *d*, and put the weight X in the fcale *e*; and let this be fo determined, that one grain more fhall be too much, and one grain lefs too little. Then the ballance being gently moved up or down by the fcrew P, till the equilibrium be nicely fhewn at *o*; and then if the index T be at the middle point *a* of the wire *r s*, it fhews that the weights put into the fcale *e*, are juft equal to the weight of the body. By this method we find the abfolute weight of the body; the relative weight is found by weighing it hydroftatically in water, as follows.

Inftead of putting the body into the fcale *e*, as before, let it be appended with the weight F at the hook *c*, by a horfe-hair as at R, fuppofing the veffel of water O were away; then the equilibrium being made, the index T ftanding between *a* and *r*, at the 36th divifion, fhews the weight of the body put in 1095.36 grains. As it thus hangs, let it be immerfed in the water of the veffel O, and it will become lighter by much; the fcale *e* will defcend till the beam of the ballance refts on the fupporter *z*. Then fuppofe 100 grains put into the fcale *d* reftores the equilibrium precifely, fo that the index T ftands at the 36th divifion above *a*; it is plain the weight of an equal bulk of water would, in this cafe, be exactly 100 grains.

After a like manner may this ballance be applied to find the fpecific gravities of fluids, which will not be difficult from what has been faid.

Bradford's new HYDROSTATICAL INSTRUMENT, a new invention for weighing coin, and difcovering its defect either of weight or purity.

It confifts of a thin, flat, brafs-ruler, about half a foot long; on each fide of which are two graduated lines, thofe on the upper fide being marked A and W (plate CXXXIX. fig. 1. n° 1.) and thofe on the under fide B and W, *ibid.* n° 2. There is alfo a fmall chain and pincers wherein to fix any piece of money intended to be weighed and proved; together with two pair of center-pins, marked A and B, *ibid.* n° 2 and 3, whereof the former pair A are to be ufed for proving all pieces of gold not exceeding the value of 36 s. and the other pair marked B, for all pieces from 36 s. to 72 s. or 3 l. 12 s. Laftly, there is a fliding-piece or index C,

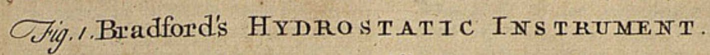


Fig. 1. Bradford's HYDROSTATIC INSTRUMENT.

No. 1.

10 20 30 35 A

10 20 30 35 W

No. 2.

40 B A 50 60 70 B

40 0 500 60 70 W

C B A

No. 3

Fig. 2. HYPNUM.

Fig. 3. HYSSOP.









T. Jefferys sculp.

(*ibid.* n°. 3.) by the motion of which backwards and forwards upon the ruler, the value of any piece suspended in the pincers is found upon the graduated lines already mentioned; whereof those marked A and B are called statical lines, as being calculated for weighing the piece in air; and those marked W, W, are called hydrostatical lines, as serving to point out the alloy or adulteration of the piece weighed. A whole division on each line, is equal to the weight or value of 1 s. in gold; a half division to 6 d. and a quarter division to 3 d.

To prove a guinea: first suspend it in the pincers, and then placing the inside of the sliding-piece C to 21 on the line A, on the upper side of the ruler, which must move freely on the center-pins marked A; and if the guinea and sliding-piece exactly ballance each other, the guinea is full weight: if not, move the slider backward or forward, till they equiponderate, and the division cut by the inside of the slider is the true weight; for instance, suppose it rests at 20½, then does the guinea weigh only 20 s. 6 d. In the next place, to prove the alloy of this piece, let the slider be brought to the division 20½ upon the hydrostatical line marked W; for whatever division is cut by the slider; in weighing on the statical line, it must be placed at the same on the hydrostatical line adjoining. Then let the piece, together with the pincers, and the brass-link whereon it is suspended, be immersed in water, (*ibid.* n° 3.) as far as the notch in the said link; and if the instrument acts in equilibrio, or the piece sink deeper in the water, the guinea is standard-gold: but if the slider must be moved farther backward before it will equiponderate, the guinea is adulterated. If alloyed with silver, allow 2 s. for every penny it wants in the hydrostatical weight; and then, if the number of pence the piece is deficient in weight hydrostatically, when doubled, exceed the number of shillings it weighs statically, you may conclude it is adulterated with some baser metal than silver. However, a more speedy method of discovering whether a piece of gold be adulterated or not, without moving the slider more than once, is this: when you have weighed a piece statically, bring the slider to the division on the hydrostatical line expressing its weight; and immersing the piece and pincers as before, so that the surface of the water may be exactly at the notch or mark on the long link, if the instrument doth not then equiponderate, gently lower your hand that holds the fluid till the instrument comes to an equilibrium; at which time, if the guinea be a counterfeit, great part of the pincers will appear above water; and if a 36s. piece be tried, not only the pincers, but a small part of the coin will appear above the surface, if the piece be counterfeit. This last method is sufficiently near the truth for common practice.

If you should have occasion to weigh and prove a very small piece of gold, as 2 s. 3 d. or 4 s. 6 d. the method is to put the said piece in the pincers with some other piece that has been proved before; by which means, the weight and alloy of the small piece may be easily discovered, as above. And if the piece be above 36 s. then the slider is to be placed according to the divisions of the statical and hydrostatical lines on the under side of the instrument; which is fitted to the standard of the mint, that makes the guinea to weigh 129 grains.

HYDROSTATICS, that part of philosophy which treats of the nature, gravity, and pressure of fluids, all which have been explained and illustrated under the article FLUID.

The application of hydrostatics to the several uses of life, will be evident from the following instances. Having first premised that a cubic foot of common water weighs nearly 1000 ounces of averdupois, or 62 pounds and a half, which may be reduced to troy-weight by considering that the averdupois pound is to the troy pound as 17 to 14, and the averdupois ounce to the troy ounce, as 51 to 56. Hence to find the quantity of pressure against a sluice or bank that pens the water, we have this rule: multiply the area of the sluice under water by the depth of the center of gravity in feet, and the product again by 62½; this last product will be the number of pounds required. Example: admit the length of a sluice to be 20 feet, and the depth of the water 5, then will the area under water be 100 square feet; which multiplied by 2½, the depth of the center of gravity, gives 250 cubic feet; which again multiplied by 62½, gives 15625 lb. equal to 7 tons nearly.

Again; since the weight of bodies is always as the specific gravities in equal bulks, it follows that the numbers in the table

table of fpecific gravities, do alfo exprefs the number of averdupois ounces contained in a cubic foot of each refpective fort of matter therein mentioned. See the article GRAVITY.

Therefore, if the magnitude of any body be multiplied by the fpecific gravity, the product will be its abfolute weight.

Another ufeful hydroftatic problem, is to find the magnitude of any thing when the weight is known; which is done by dividing the weight by the fpecific gravity, and the quotient is the magnitude fought. Alfo by knowing the magnitude and weight, we can find the fpecific gravity by dividing the weight of the magnitude in cubic feet.

Having found by the hydroftatic ballance the fpecific gravity of gold to filver as 19 to 11, and fuppofing any compound thereof, as Hiero's crown, whofe fpecific gravity is 16, to determine the proportion and weight of the gold and filver employed in making it, fay, as the difference of the fpecific gravities of the compound and the lighter ingredient, *viz.* 5, is to the difference of the fpecific gravities of the heavier ingredient and the compound, *viz.* 3, fo is the bulk of gold to that of filver made ufe of; that is, if the whole crown were divided in 8 parts, the gold would confift of 5, and the filver of 3: then the magnitudes 5 and 3 multiplied by the fpecific gravities 19 and 11, feverally, will give the number 95 and 33, which exprefs the proportion of the gold to that of the filver. See the article HYDROSTATICAL BALLANCE.

But how great the ufefulnefs and importance of hydroftatic knowledge is to phyficians, chymifts, apothecaries, jewellers, goldfmiths, *&c.* will appear by reading Mr. Boyle's excellent Medicina Hydroftatica, in which book the fkilful author propofes the following ufes to be made of hydroftatic knowledge, *viz.*

1. To explore the nature and difference of foffils, by finding their fpecific gravities. For fince the moft pure and homogeneous kinds of ftones are in gravity to water as about $2\frac{1}{2}$ to 1, and tin, the lighteft of metals, is to water in gravity as about 7 to 1, if a ftony fubftance be found to have a greater proportion of gravity than that of $2\frac{1}{2}$ to 1, it muft be probable that it has in it fome adventitious matter of a metalline nature; or is at leaft commixed with fome mineral body more heavy than pure ftone, and may therefore very probably be ufefully applied to fome medicinal purpofes. As inftances of this kind, he mentions the lapis hæmatites, lapis lazuli, and lapis calaminaris, all which have their ufes in phyfic.

2. He propofes this method as very certain to determine whether a body, fuppofed to be a ftone of the mineral kind, be fo indeed. Thus coral which, fays he, fome take to be a plant, and others a lithodendron, but moft reckon it among precious ftones, is in gravity to water as 2,68, to 1, which favours the laft opinion: thus a calculus humanus and a bezoar were found as 1,7 and 1,5 to 1; and therefore too light, to be of the fame fpecies with the common ftone.

3. A third ufe which he propofes is to difcover the refemblance or difference between bodies of the fame denomination, and thereby to collect and afcertain their feveral degrees of goodnefs refpectively. Whence he argues the neceffity of this fort of knowledge to phyficians, chymifts, apothecaries, druggifts, to the goldfmith, the merchant, the miner, *&c.*

4. A fourth ufe is to difcern genuine ftones from counterfeit ones, which may be of great help to jewellers: here he gives inftances of factitious coral, and factitious gems, and a bezoar, which he found out that way not to be genuine, tho' a great price was fet on the latter.

5. Hence mercury is faid to have a different gravity, being fometimes $13\frac{1}{2}$, and fometimes above 14 times heavier than water; and hence a notable difference may arife in weather glaffes at the fame time, and in the fame place, even to a whole inch, from the different gravity of the mercury in the one and in the other: therefore, thofe who publifh regifters of the weather, ought to find out and declare to the world the fpecific gravity of the quick-filver they ufe in their barometers.

6. Thefe he enumerates over and above what we have taken notice of a mechanichal and geometrical nature, and to let us know the high value he had for this fcience, he expreffes himfelf thus: "As "little fkill as I have in hydroftatics, I "would not be debarred from the ufe "of them for a confiderable fum of "money; it having already done me "acceptable fervice, and on far more "occafions than I myfelf at firft expected, efpecially in the examen of metals, "and mineral bodies, and of feveral "mineral

"mineral productions," with much to the same purport.

HYDROTICS, among physicians, signify medicines more usually called sudorifics. See the article SUDORIFIC.

HYGIEINE, from ὑγιεια, health, that part of medicine which prescribes rules for the preservation of health; which depends, in a great measure, on the prudent use of the non-naturals, air, diet, exercise, sleep, passions of the mind, retentions and excretions. See the article AIR, DIET, EXERCISE, &c.

HYGROMETER, a machine, or instrument whereby to measure the degrees of dryness, or moisture of the air, or rather of the atmosphere. See the articles AIR, and ATMOSPHERE.

There are divers sorts of hygrometers; for whatever body either swells or shrinks, by dryness or moisture, is capable of being formed into an hygrometer. Such are woods of most kinds, particularly ash, deal, poplar, &c. Such also is catgut, the beard of a wild oat, &c. Stretch an hempen cord or lute-string, as A B, (plate CXL. n° 1.) along a wall, bringing it over a pulley, B; and to the other end D, fix a weight E; into which fit an index G. On the same wall fit a plate of metal H I, divided into any number of equal parts, and the hygrometer is compleat. For it is known from experience that moisture sensibly shortens the length of cords or fiddle-strings; and that as the moisture evaporates, they return to their former length. The weight, therefore in the present case, upon an increase of the moisture of the air, will ascend; and upon a diminution of the same, it will descend.

Hence, as the index G will shew the spaces of ascent and descent; and those spaces are equal to the increments and decrements of the length of the cord, or gut, A B D; the instrument will discover whether the air be more or less humid now, then it was at another given time.

But if a more sensible and accurate hygrometer be required, strain a whip cord or fiddle-string, over several pullies B, C, D, E, F, and G. (*ibid.* n° 2.) and proceed as in the former example. Nor does it matter whether the several parts of the cord A B, B C, C D, &c. be parallel to the horizon as expressed in the figure or perpendicular to the same.

The advantage of this above the former hygrometer, is, that we have the greater length of cord in the same compass; and consequently greater contraction or dilatation.

Another method of construction, which is more simple, is thus. Fasten a hempen cord or fiddle-string, A B, (*ibid.* n° 3.) to an iron-hook; and let the other end, B, descend upon the middle of a horizontal board, or table, E F; near B, hang a leaden weight or ball of a pound, C, and fit an index C G. Lastly, from the center B describe a circle, which divide into any number of equal parts. Or, instead of the table or board, draw two concentric circles on the ball K from I. (n° 4.) and divide them into any number of equal parts, and fix an index N O, to any proper support N. So that it may almost touch the divisions of the ball. Here the cord or gut twisting or untwisting will shew the change of moisture, &c. by the successive application of the index to the division of the circle.

Or thus: provide two wooden frames, A B and C D, (n° 5.) with grooves therein; and between these grooves fit two thin leaves of ash, A E F C, and G B D H, so as they may easily slide either way. At the extremes of the frames A, B, C, D, confine the leaves with nails, leaving between them the space E G H F, about an inch wide. On I fasten a slip of brass dented, I K; and in L a little dented wheel, upon whose axis, on the other side of the machine an index is to be put. Lastly, from the center of the axis, on the same side, draw a circle, and divide it into any number of equal parts. Now, it is found from experience, that ashen wood readily imbibes the moisture of the air, and swells therewith; and as that moisture slackens, shrinks again; upon any increase of the moisture of the air, the two leaves A F and B H growing turgid, will approach nearer each other: and, again, as the moisture abates, they will shrink, and again recede. Hence, as the distance can neither be increased or diminished without turning the wheel L, the index will point out the changes in respect of humidity, or siccity. From this contrivance it was that Mr. Coniers in the Philosophical Transactions made the following observations for five or six years.

1. That these pannels will move by shrinking most in summer, and swelling most in winter; but will vary from this according to the change, to the then more or less heat or cold, moisture or drought, that the temper or season, such as

as ſpring or fall, do produce; it being then more apt to ſwell or ſhrink on the ſudden, but not attaining then to the higheſt ſhrinking or ſwelling, as in ſummer and winter it doth. 2. That for the moſt part, eſpecially in the ſpring and ſummer-time, this motion happens only in the day-time; for then generally all night it reſts, and moves very ſeldom. 3. That one kind or manner of this motion happens in dry, fair weather, but ſometimes in the forepart of the forenoon, and ſometimes not until the latter part of the forenoon, and then at that time it relaxes or ſwells the deal for about two or three hours; more, ſeldom; leſs, often; and then all the afternoon after it ſhrinks; nay, ſometimes even when a ſmall rain hath newly fallen, or is then falling. 4. This ſhrinking is gradual very often, or for the moſt part a little after a moiſt time, *viz.* the firſt day after moiſture it ſhrinks a little; the ſecond, more, and ſo yet more, according to the then ſeaſon of the year, and as it is then inclined to moiſture or drought, the alteration of the wind, and the heat or cold at that time. 5. The wind's being in the north, north-eaſt, and eaſt, winter and ſummer, for the moſt part at that time the deal ſhrinks, in the night alſo as well as in the day, but not ſo much; which is a ſign of drying weather, and ſometimes of froſt or cold in winter, heat or ſcorching in ſummer, in a clear day. But on the contrary, the ſouth wind's blowing, or the weſt and ſouth-weſt, the deal always relaxes that day, or is at leaſt at a ſtay, provided this happen in the day-time; for then if in the night, not ſo much; and ſo this will do ſome conſiderable time before rain. 6. By a conſtant obſervation of this inſtrument, you may be able to gueſs at the wind's ſituation without a weather-cock, provided you have by you a common and ſealed thermometer. 7. Alſo you may know the time of the year: for in the ſpring it moves quicker, and more in winter; in ſummer it is more ſhrunk than in the ſpring; in autumn leſs in motion than in ſummer.

It is to be obſerved, that all the hygrometers above deſcribed become by degrees leſs and leſs accurate, and at length undergo no ſenſible alteration at all from the humidity of the air.

The following is much more laſting. Take a nice ballance (*ibid.* n° 6.) and place in it a ſponge, or other body, which eaſily imbibes moiſture; and let it be in equilibrio, with a weight hung at the other end of the beam. Now if the air becomes moſt, the ſponge becoming heavier, will preponderate; if dry, the ſponge will be raiſed up. This ballance may be contrived two ways; by either having the pin in the middle of the beam, with a ſlender tongue a foot and a half long, pointing to the diviſions on an arched plate fitted to it; or, the other extremity of the beam may be made ſo long as to deſcribe a large arch on a board placed for the purpoſe, as is repreſented in the figure.

To prepare the ſponge, it may be neceſſary to waſh it in water; and when dry again, in water or vinegar, wherein ſal armoniac, or ſalt of tartar, has been diſſolved, and let it dry again, then it is fit to be uſed.

In the laſt mentioned hygrometer, Mr. Gould, in the Philoſophical Tranſactions, inſtead of a ſponge, recommends, oil of vitriol, which is found to grow ſenſibly lighter or heavier, in proportion to the leſſer or greater quantity of moiſture it imbibes from the air; ſo that being ſatiated in the moiſteſt weather, it afterwards retains or loſes its acquired weight, as the air proves more or leſs moiſt. The alteration in this liquor is ſo great, that in the ſpace of fifty-ſeven days, it has been known to change its weight from three drachms to nine; and has ſhifted an index or tongue of a ballance thirty degrees. A ſingle grain, after its full increaſe, has varied its equilibrium ſo ſenſibly, that the tongue of a ballance, only an inch and a half long, has deſcribed an arch one third of an inch in compaſs, (which arch would have been almoſt three inches if the tongue had been one foot) even with ſo ſmall a quantity of liquor; conſequently, if more liquor, expanded under a large ſurface, were uſed, a pair of ſcales might afford as nice an hygrometer as any kind yet invented. The ſame author yet ſuggeſts, that oil of ſulphur per campanum, or oil of tartar per deliquium, or the liquor of fixed nitre, might be ſubſtituted in lieu of the oil of vitriol.

But among all the inventions the following ſeems beſt calculated both for diſpatch and accuracy. A (*ibid.* n° 7.) repreſents a thin piece of ſponge, ſo cut as to contain as large a ſuperficies as poſſible. This hangs by a fine thread of ſilk, upon the beam B, and is exactly ballanced

ballanced from another thread of silk at D, strung with the smallest lead shot, at equal distances, and so adjusted as to cause the index E to point at G, in the middle of the graduated arch F G H when the air is in a middle state between the greatest moisture and the greatest dryness. I, shews a little table or shelf for that part of the silk and shot which is not suspended to rest upon.

HYLE, or HYLEC, among alchymists, denotes their first matter, or the original chaos of things.

HYLEG, or HYLECH, in astrology, signifies a planet, or the point in the heavens which at a person's nativity, is accounted the significator of life. See the article NATIVITY.

HYMEN, in anatomy, a membrane, sometimes of a circular, sometimes of a semilunar figure, and sometimes of a form different from both. It is always found in young girls, and stops a part of the vagina. In these it has a small aperture, and a longer in adults who have not conversed with men. After the first coitus it is not to be found: it is always destroyed by it, and if it has not been injured before, some blood always follows the rupture of it.

In the heathen mythology, Hymen was the god of marriage, and new-married women offered sacrifices to this deity. He was represented crowned with sweet marjoram, and sometimes with roses; carrying in one hand a torch, and in the the other a flame-coloured veil, to represent the blushes of a virgin.

HYMENÆA, in botany, a genus of the polygamia trioecia class of plants, the flower of which is papilionaceous, and its fruit a large legumen or pod, of an ovato-oblong figure, obtuse, and unilocular, with numerous oval seeds, surrounded with fibres and farinaceous matter.

HYMENÆAL, something belonging to marriage, so called from hymen. See the articles HYMEN and MARRIAGE.

The hymenæal song is otherwise called epithalamium. See EPITHALAMIUM.

HYMENOPTERA, in the history of insects, a name given to those insects, which have four wings, and those all entirely membranaceous. See INSECT.

HYMN, a religious song. The hymns sung in the christian church, as distinguished from the psalms, are pieces of poetry composed by pious, but not inspired authors.

The use of music in religious worship has prevailed in all nations from the remotest ages. The antient heathens were of opinion, that it appeased the anger of the gods, for which reason their public devotion was generally attended with a concert of voices and instruments.

Music has likewise been consecrated to religion, both by the Jews and Christians; and the former made use of trumpets, drums and cymbals, joined with the voices of the levites and people: but the music of the antient christians was plain and solemn, and consisted only in singing hymns, or psalms, with joint voices. The priscillianists pretended to shew, among their apocryphal writings, the hymn which our blessed Lord sung with his disciples, after his last supper. But it is generally supposed, that they sung the hymn which the Jews were used to sing after eating the passover.

HYOIDES, in anatomy, a bone which adheres to the base of the tongue.

In young subjects the os hyoides is composed of three bones, a base, occupying its middle part, and two lateral ones, called its horns. In adults there are often, at the junctures of these with the base, two other frustræ, very small, and thence overlooked by most writers: these are nearly of the shape of a wheat-corn, and may therefore be called ossa triticea: there are ligaments fixed to these, by means of which they adhere to the styloide processes. And, finally, in these ligaments themselves, sometimes, tho' very rarely, there are found some other little bones. Vesalius met with six of these; and some others after him have reckoned eleven bones to the formation of the os hyoides. The use of the os hyoides is to give a firm basis to the tongue: and therefore several muscles of the tongue and larynx, serving to the necessary motions of both, are inserted into it.

HYOSCYAMUS, HEN-BANE, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of a single infundibuliform petal, with a short cylindrical tube, and an erecto-patent limb lightly divided into five obtuse segments, one of which is broader than the rest: the fruit is a capsule of an ovato-obtuse figure, with a line marked on each side; it contains two cells, with numerous seeds.

The root of this plant, according to Dale, is an excellent refrigerant and emollient, but is said to occasion madness; for which reason it is very rarely used internally. Its seeds are recommended in an hæmoptysis, and hæmorrhages; but

but those of the white henbane are said to be much milder and safer.

HYOSERIS, SWINE'S SUCCORY, in botany, a genus of the syngenesia-polygamia-æqualis class of plants; the compound flower of which is uniform, with ten hermaphrodite corollulæ disposed into one or more orbs; the partial one is monopetalous, ligulated, linear, truncated, and quinquedentated; the stamina are five capillary, very short filaments; there is no pericarpium besides the cup; the seed is single, oblong, compressed, of the length of the cup, coronated with a peculiar calyculum and a small capillary down; the receptacle is naked.

This genus comprehends the taraxaconastrum of Vaillant, and the leontodontoides of Micheli.

HYOTHYROIDES, in anatomy, a muscle of the larynx, which serves to raise it, and constringe the glottis.

HYPÆTHROS, or HYPÆTHRON, in antient architecture, a kind of temple open at the top.

Vitruvius says, it was an open building or portico, which had no roof or covering, as the temple of Jupiter Olympius, built by Cassatius, a roman architect at Athens.

HYPALLAGE, among grammarians, a species of hyperbaton, consisting in a mutual permutation of one case for another. Thus, Virgil says, *dare classibus austros*, for *dare classes austris*; and again, *necdum illis labra admovi*, for *necdum illa labris admovi*.

HYPANTE, or HYPERPANTE, a name given by the Greeks to the feast of the presentation of Jesus in the temple.

This word, which signifies lowly or humble meeting, was given to this feast, from the meeting of old Simon and Anna the prophetess in the temple, when Jesus was brought thither.

HYPATE, in antient music, an appellation given to the lowest chord of a tetrachord. Thus hypate hypaton, was the lowest chord of the hypaton tetrachord, and answered to our B natural of the lowest octave of the organ; or to the lowest *mi* of Guido's scale. The hypate meson was the last note of the hypaton, and the first of the meson tetrachord. See the article DIAGRAM.

HYPECOUM, *wild* CUMIN, in botany, a genus of the tetrandria-digynia class of plants, the corolla whereof consists of four petals; the two exterior petals are broad, trilobated, and obtuse, and are placed over-against one another; the two interior ones stand alternately with the others; they are lightly divided into three segments, of which the middle one is hollow, compressed and erect: the fruit is a long compressed pod, incurvated, and articulated: the seeds are of a roundish figure, but compressed, and are placed singly in the articulations of the pod.

This plant is an opiate.

HYPER, ὑπέρ, a greek preposition, frequently used in composition, where it denotes excess; its literal signification being above, or beyond.

HYPERBATON, in grammar, a figurative construction inverting the natural and proper order of words and sentences. The several species of the hyperbaton are the anastrophe, the hysteron-proteron, the hypallage, synchysis, tmesis, parenthesis, and the hyperbaton, strictly so called. See ANASTROPHE, &c.

HYPERBATON, strictly so called, is a long retention of the verb, which completes the sentence, as in the following example from Virgil.

Interea reges: ingenti mole Latinus
Quadrijugo vehitur curru, cui tempora circum
Aurati bis sex radii fulgentia cingunt,
Solis avi specimen: bigis it Turnus in albis,
Bina manu lato crispans hastilia ferro:
Hinc pater Æneas Romanæ stirpis origo,
Sidereo flagrans clypeo & cælestibus armis;
Et juxta Ascanius magnæ spes altera Romæ:
Procedunt *castris*.

HYPERBOLA, in geometry, the section GEH (plate CXLI. n° 1.) of a cone ABC, made by a plane, so that the axis, EF, of the section inclines to the opposite leg of the cone, BC, which in the parabola is parallel to it, and in the ellipsis intersects it. The axis of the hyperbolical section will meet also with the opposite side of the cone, when produced above the vertex, at D.

Definitions. 1. If at the point E (*ibid.* n° 2.) in any plane, the end of the rule EH be so fixed, that it may be freely carried round, as about a center; and at the other end of the rule H there is fixed the end of a thread shorter than the rule, and let the other end of the thread be fixed at the point F in the same plane; but the distance of the points EF must be greater than the excess of the rule above the length of the thread; then let the thread be applied to the side of the rule EH by the help of a pin G, and be stretched along it; afterwards let the rule

rule be carried round, and in the mean time let the thread kept ftretched by the pin be conftantly applied to the rule: a certain line will be defcribed by the motion of the pin, which is called the hyperbola. But if the extremity of the fame rule, which was fixed in the point E, is fixed in the point F, and the end of the thread is fixed in the point E, and the fame things performed as before; there will be defcribed another line oppofite to the former, which is likewife called an hyperbola; and both together are called oppofite hyperbolas. Thefe lines may be extended to any greater diftance from the points E, F, *viz.* if a thread is taken of a length greater than that diftance. 2. The points E and F are called the foci. 3. And the point C, which biffects the right line betwixt the two focus's, is called the center of the hyperbola, or of the oppofite hyperbolas. 4. Any right line paffing thro' the center, and meeting the hyperbolas, is called a tranfverfe diameter; and the points in which it meets them, their vertices: but the right line, which paffes thro' the center, and biffects any right line terminated by the oppofite hyperbola's, but not paffing thro' the center, is called a right diameter. 5. The diameter which paffes thro' the foci, is called the tranfverfe axis. 6. If from A or *a*, the extremities of the tranfverfe axis, there is put a right line A D equal to the diftance of the center C from either focus, and with A, as a center, and the diftance AD, there is a circle defcribed, meeting the right line, which is drawn thro' the center of the hyperbola at right angles to the tranfverfe axis, in B *b*; the line B*b*, is called the fecond axis. 7. Two diameters, either of which biffects all the right lines parallel to the other, and which are terminated both ways by the hyperbola or oppofite hyperbolas, are called conjugate diameters. 8. Any right line not paffing thro' the center, but terminated both ways by the hyperbola or oppofite hyperbolas, and biffected by a diameter is called an ordinate applied, or fimply an ordinate to that diameter: the diameter likewife, which is parallel to that other right line ordinately applied to the other diameter, is faid to be ordinately applied to it. 9. The right line which meets the hyperbola in one point only, but produced both ways falls without the oppofite hyperbolas, is faid to touch it in that point, or is a tangent to it. 10. If thro' the vertex of the tranfverfe axis a right line is drawn equal and parallel to the fecond axis, and is biffected by the tranfverfe axis, the right lines drawn thro' the center and the extremities of the parallel line are called afymptotes. 11. The right line drawn thro' the center of the hyperbola, parallel to the tangent, and equal to the fegment of the tangent betwixt the afymptotes, and which is biffected in the center, is called the fecond diameter of that which is drawn thro' the point of contact. 12. A third proportional to two diameters, one of which is the tranfverfe, the other fecond to it, is called the *Latus rectum*, or parameter of that diameter, which is the firft of the three proportionals. And, 13. Laftly, n° 5. If upon two right lines A *a*, B *b*, mutually biffecting each other at right angles, the oppofite hyperbolas A G, *ag* are defcribed; and if upon the fame right lines there are defcribed two other oppofite hyperbolas B K, *b k*, of which the tranfverfe axis B *b*, is the fecond axis of the two firft; and the fecond axis of the two laft, A *a*, is the tranfverfe axis of the two firft; thefe four are called conjugated hyperbolas, and their afymptotes fhall be common.

Prop. I. (*ibid.* n° 2.) The fquare of the half of the fecond axis is equal to the rectangle contained by the right lines betwixt the foci and the vertexes of the tranfverfe axis.

Let A *a* be the tranfverfe axis, C the center, E and F the foci, and B *b* the fecond axis, which is evidently biffected in the center C, from the definition; let A B be joined: then fince (by def. 6.) AB and CF are equal; the fquares of A C and C B together will be equal to the fquare of C F, that is, (6. 2.) to the fquare of A C and the rectangle A F *a* together; wherefore taking away the fquare of A C which is common, the fquare of C B will be equal to the rectangle A F *a*.

Prop. II. If from any point G (*ibid.* n° 3, 4.) of the hyperbola, a right line G D is drawn at right angles to the tranfverfe axis A *a*, and if from the fame point there is drawn the right line GF to the focus neareft to that point; the half of the tranfverfe axis C A will be to the diftance of the focus from the center, *viz.* C F, as the diftance of the perpendicular C D,

C D, is to the ſum of the half of the tranſverſe axis, and the right line drawn to the focus.

Let G E be drawn to the other focus, and on the axis *a* A produced, let there be ſet off A H equal G F; then with the center G, and the diſtance G F, deſcribe a circle cutting the axis *a* A in K and F, and the right line E G in the points L and M: then ſince E F is double C F, and F K double F D, E K ſhall be alſo double C D; and ſince E L or A *a*, is double C A, and L M double G F or A H, E M ſhall alſo be double C H: but becauſe of the circle E L or A *a*: E F : : E K : E M : and taking their halves, it will be as C A : C F : : C D: C H.

Prop. III. (*ibid.* n° 3, 4.) the ſame things being ſuppoſed, if from A the extremity of the tranſverſe axis neareſt to the point G, there is ſet off a right line A H on the axis produced, equal to the diſtance of the point G from the focus F, neareſt to the ſaid extremity; the ſquare of the perpendicular G D ſhall be equal to the exceſs of the rectangle E H F, contained under the ſegments betwixt H (the extremity of the right line A H) and the foci, above the rectangle A D *a* contained under the ſegments cut off betwixt the perpendicular and the extremities of the axis.

For ſince the right line C H is any how cut in A, the ſquares of C A and C H together will be equal to twice the rectangle A C H, and the ſquare of A H, (7. 2.) *i. e.* becauſe C A, C F, C D, C H are proportionals, to twice the rectangle F C D, and to the ſquare of A H or G F; that is, to twice the rectangle F C D and the ſquares of F D and D G, that is, to the ſquares of F C, C D, and D G, (7. 2.) wherefore the two ſquares of C A and C H are equal to the three ſquares of F C, C D, and D G; and taking away the ſquares of C A and C F from both ſides, the remaining rectangle E H F, will be equal to the remaining rectangle A D *a*, and to the ſquare of D G (6. 2.)

Prop. IV. (*ibid.* n° 3, 4.) If from any point G of the hyperbola, there is drawn a right line parallel to the ſecond axis B *b*, meeting the tranſverſe axis A *a* in D; the ſquare of the tranſverſe axis ſhall be to the ſquare of the ſecond axis, as the rectangle contained under the ſegments of the tranſverſe axis betwixt the parallel and its extremes, to the ſquare of the parallel.

Prop. V. (*ibid.* n° 4.) If from any point G of the hyperbola there is drawn a right line parallel to the tranſverſe axis A *a*, meeting the ſecond axis in N; the ſquare of the ſecond axis, ſhall be to the ſquare of the tranſverſe, as the ſum of the ſquares of the half of the ſecond axis and its ſegment betwixt the center and the right line, to the ſquare of the line itſelf; that is, $CB^2 : CA^2 : : CB^2 + GD^2 : CA^2 +$ the rectangle A D *a*; that is, as $CB^2 + CN^2$ is to CD^2 or GN^2.

Prop. VI. (*ibid.* n° 5.) It is another property of the hyperbola, that the aſymptotes, D *d*, E *e*, do never abſolutely meet with the curve. See ASYMPTOTE.

Prop. VII. If through any point F (*ibid.* n° 5.) of the hyperbola, there is drawn a right line I F L parallel to the ſecond axis, and meeting the aſymptotes in I and L; the rectangle contained under the right lines which are intercepted betwixt the aſymptotes and the hyperbola, is equal to the ſquare of the half of the ſecond axis, that is, $CB^2 = IFL = IHL$.

Prop. VIII. (*ibid.* n° 6.) If from any point F of the hyperbola, there is drawn to the tranſverſe diameter, A B, a right line ordinately applied to it F G; and from the extremity of the diameter there is drawn A H perpendicular to it, and equal to the *latus rectum*; the ſquare of the ordinate ſhall be equal to the rectangle applied to the *latus rectum*, being of the breadth of the abſciſſa betwixt the ordinate and the vertex, and which exceeds it by a figure like and alike ſituated to that which is contained under the diameter and the *latus rectum*.

For join B H, and from the point G let there be drawn G M parallel to A H, and meeting B H in M, and through M let there be drawn M N parallel to A B meeting A H in N, and let the rectangles M N H O, B A H P, be compleated. Then ſince the rectangle A G B, is to the ſquare of G F, as A B is to A H, *i. e.* as G B is to G M, *i. e.* as the rectangle A G B is to the rectangle A G M; A G B ſhall be to the ſquare of G F, as the ſame A G B to the rectangle A G M: wherefore the ſquare of G F is equal to the rectangle A G M, which is applied to the *latus rectum* A H, having the breadth A G, and exceeds the rectangle H A G O, by the rectangle M N H O, like to B A H P; from which exceſs the name of

of hyperbola was given to this curve by Apollonius.

Prob. I. n° 7. An eafy method to defcribe the hyperbola, having the tranfverfe diameter, D E, and the foci N, *n* given. From N, at any diftance, as N F, ftrike an arch; and with the fame opening of the compaffes with one foot in E the vertex, fet off E G equal to N F in the axis continued; then with the diftance G D, and one foot in *n*, the other focus, crofs the former arch in F. So F is a point in the hyperbola: and by this method repeated may be found any other point *f*, further on, and as many more as you pleafe.

An afymptote being taken for a diameter; divided into equal parts, and through all the divifions, which form fo many abfciffes continually increafing equally, ordinates to the curve being drawn parallel to the other afymptote; the abfciffes will reprefent an infinite feries of natural numbers, and the correfponding hyperbolic, or afymptotic fpaces, will reprefent the feries of logarithms of the fame number. See the article LOGARITHM.

Hence different hyperbolas will furnifh different feries of logarithms; fo that to determine any particular feries of logarithms, choice muft be made of fome particular hyperbola. Now the moft fimple of all hyperbolas is the equilateral one, *i. e.* that whofe afymptotes make a right angle between themfelves.

For the locus of any hyperbola. See the article LOCUS.

For the quadrature of the hyperbola. See the article QUADRATURE.

Ambigenal hyperbola is that which has one of its infinite legs infcribed, and the other circumfcribed.

Equilateral hyperbola is that wherein the conjugate axes are equal.

Apollonian hyperbola is the common hyperbola, or the hyperbola of the firft kind: thus called in contradiftinction to the hyperbolas of the higher kinds, or infinite hyperbolas: for the hyperbola of the firft kind, or order, has two afymptotes; that of the fecond order has three; that of the third, four, &c.

HYPERBOLÆON, in antient mufic, the upper or laft tetrachord or fourth.

It was thus called from its being high or fhrill, when compared with the other fourths. It was conjoint to another below it, called diezeugmenon.

HYPERBOLE, in rhetoric, a figure, whereby the truth and reality of things are exceffively either enlarged, or diminifhed. See the article EXAGGERATION

The word is greek, ὑπερβολη, fuperlatio, formed of the verb ὑπερβαλλειν, *exfuperare*, to exceed, furpafs by far.

The character of an hyperbole is to exaggerate or extenuate the idea of the things fpoken of, beyond the bounds of truth, or even probability. As, he ran fwifter than the wind: he went flower than a tortoife, &c. Hyperboles, fays Seneca, lie without deceiving; they lead the mind to truth by fictions; they convey the fentiment intended, tho' by expreffing it in terms which render it incredible. The hyperbole promifes too much, in order to make you conceive enough.

Ariftotle obferves, that hyperboles are the favourite figures of young authors, who love excefs and exaggeration; but that philofophers fhould not ufe them without a great deal of referve. The pitch to which an hyperbole may be carried, is a point of great delicacy. To carry it too far, is to deftroy it: it is of the nature of a bowftring, which by immoderate tenfion, flackens; and frequently has an effect quite contrary to that intended.

Thofe hyperboles are beft, which are latent, and are not taken for hyperboles. For this reafon they fhould fcarce ever be ufed but in a paffion, and in the middle of fome important incident: fuch is the hyperbole of Horodotus, fpeaking of the Lacedæmonians, who fought at Thermopylæ: "They defended themfelves for fome time with the arms "that were left them, and at laft with "their hands and teeth; till the Barbarians, continually fhooting, buried them as it were, with their "arrows."

Now what likelihood is there, that naked men fhould defend themfelves with their hands and teeth againft armed men; and that fo many perfons fhould be buried under their enemies arrows? Yet does there appear fome probability in the thing, by reafon it is not fought for the fake of the figure, but the hyperbole feems to arife out of the fubject itfelf. Of the like kind is that paffage in a comic poet mentioned by Longinus; "He had lands in the country no larger "than a Lacedæmonian epiftle."

HYPERBOLIC, or HYPERBOLICAL, fome-

fomething relating either to an hyperbole, or an hyperbola. See the article HYPERBOLE and HYPERBOLA.

Thus we fay, an hyperbolic expreffion; an hyperbolic image, &c.

HYPERBOLIC CONOID. See the article CONOID.

HYPERBOLIC CYLINDROID, is a folid figure, wofe generation is given by Sir Chriftopher Wren, in the Philofophical Tranfactions. Thus, two oppofite hyperbolas being joined by the tranfverfe axis, and through the center a right line being drawn at right angles to that axis; and about that, as an axis, the hyperbolas being fuppofed to revolve; by fuch revolution, a body will be generated, which is called the hyperbolic cylindroid, whofe bafes, and all fections parallel to them, will be circles. In a fubfequent tranfaction, the fame author applies it to the grinding of hyperbolical glaffes: affirming, that they muft be formed this way or not at all.

Hyperbolic leg of a curve, is that which approaches infinitely near to fome afymptote.

Sir Ifaac Newton, reduces all curves, both of the firft and higher kinds, into thofe with hyperbolic legs, and thofe with parobolic ones. See the article CURVE.

HYPERBOLIC LINE is ufed by fome authors for what we call the hyperbola itfelf. In this fenfe, the plane furface, terminated by the curve line, is called the hyperbola, or hyperbolic fpace; and the curve line that terminates it the hyperbolic line.

HYPERBOLIC MIRROUR. See MIRROUR.

HYPERBOLIC SOLID. See the article CUBATURE.

HYPERBOLIFORM FIGURES, are fuch curves as approach, in their properties, to the nature of the hyperbola; called alfo hyperboloides.

HYPERBOLOIDES, are hyperbolas of the higher kind, whofe nature is expreffed by this equation: $a y^{m \times n} = b x^{m} (a + x)^{n}$: efpecially if $m > 1$, or $n > 1$, *e. g.* $a y^{3} = b x^{2} (a + x)$.

HYPERCATALECTIC, in the greek and latin poetry, is applied to a verfe, which has one or two fyllables too much, or beyond the regular and juft meafure: as,

Mufæ forores funt Minervæ. Alfo,
Mufæ forores Palladis lugent.

The greek and latin verfes are diftinguifhed, with refpect to their meafure, into four kinds, acatalectic, catalectic, brachycatalectic, and hypercatalectic. The hypercatalectic is alfo called the hyperpreter.

HYPERDULIA, in the church of Rome, a fpecies of worfhip paid to the holy virgin; being greater than the dulia, or worfhip paid to the faints, but lefs than the latria or fupreme worfhip paid to the deity. See the article ADORATION and WORSHIP.

HYPERICUM, *St.* JOHN'S WORT, a genus of the polyadelphia polyandria clafs of plants, the flower of which confifts of five oblong, obtufe, patent petals: the fruit is a roundifh capfule, with two, three or five cells, containing a great number of oblong fmall feeds. See pl. CXXXVIII. fig. 2.

This genus comprehends the androfæmum and afcyrum of Tournefort.

St. John's wort is recommended as a vulnerary, detergent, and diuretic: it refolves coagulated blood, deftroys worms, and promotes the menfes and urine.

HYPERMETER, in the antient poetry the fame with hypercatalectic. See the article HYPERCATALECTIC.

HYPERSARCOSIS, in medicine and furgery, an excefs of flefh, or rather a flefhy excrefcence, fuch as thofe generally arifing upon the lips of wounds, &c. See WOUND and EXCRESCENCE.

HYPERTHYRON, in the antient architecture, a fort of table ufed after the manner of a frieze, over the jaumbs of doric doors and gates, and the lentils of windows. It lies immediately under the corona, and our workmen ufually call it the king-piece.

HYPHEN, an accent, or character, in grammar, implying that two words are to be joined, or connected into one compound word, and marked thus -, as pre-eftablifhed, five-leaved, &c.

Hyphens alfo ferve to connect the fyllables of fuch words as are divided by the end of the line.

HYPNOTIC, in the materia medica, fuch medicines as any way produce fleep, whether called narcotics, hypnotics, opiates, or foporifics.

Authors are of various opinions in regard to the manner wherein hypnotics operate. See the article NARCOTICS.

HYPNUM, in botany, a genus of moffes of

of the cryptogamia clafs of plants, confifting of ftalks and leaves, and producing membranaceous capfules; thefe capfules ftand on pedicles, which grow on the alæ of the leaves, and have at their bafe a kind of fquamous covering, formed of a matter quite different from the leaves of the plant: the capfules of the hypnum have all their calyptræ; they are of different fhapes, but ufually long; likewife the fquamous involucrum at the bafe of the pedicle is called by Dillenius perichætium, and is the greater characteriftic of the hypna, no moffes of any other genus having it in this form. See plate CXXXIX. fig. 2.

HYPOCAUSTUM, among the Greeks and Romans, a fubterraneous place, wherein was a furnace, to heat the baths. See the article BATH.

Another fort of hypocauftum was a kind of kiln, to heat their winter-parlours.

Among the moderns, it is that place where the fire is kept, that warms a ftove or hot-houfe.

HYPOCHOERIS, in botany, a genus of the fyngenefia-polygamia æqualis clafs of plants, the compound flower of which is imbricated, uniform, and confifts of numerous hermaphrodite fmall flowers, that are all equal; the partial flower is monopetalous, ligulated, linear, truncated, and divided into five fegments; there is no pericarpium; the cup is connivent and globofo-accuminated; the feed is fingle, oblong, and ending in a fubulated pedicle, covered with down.

HYPOCHONDRIA, in anatomy, that part of the body on both fides, which lies under the fpurious ribs, and is extended to the ilia; comprehending not only the mufcles, but the internal vifcera.

HYPOCHONDRIAC PASSION, a fpafmodico-flatulent affection of the ftomach and inteftines, arifing from a preternatural conftitution of the periftaltic motion, caufed by the ftagnation of the blood and vital fluids between the nervous and mufculous coats of the inteftines.

This difeafe is attended with fuch a train of fymptoms, that it is a difficult tafk to enumerate them all; for there is no part of the body that is not, fooner or later, a fufferer by its tyranny. It begins with tenfions and windy inflations of the ftomach and inteftines, an uncertain appetite, fometimes quite decayed, and fometimes ftrong; the aliments are ill digefted, breeding acid and vifcid crudities; there is a preffing heavy pain in the ftomach, chiefly after meals; a violent heart burn, very acid belchings and vomiting, bringing up fuch acid ftuff that the teeth are not only fet on edge, but the very linen or fheets fometimes corroded. In the inteftines, about the navel, there are felt heavy excruciating pains; in the grofs inteftines the pains are more acute. Sometimes there is a loofenefs; fometimes a moft obftinate coftivenefs, with a retention of the wind; which when it breaks out, either upwards or downwards, is attended with an alleviation of the fymptoms; but they foon rage again, with as great a violence as ever. The urine is generally thin, limpid, and pale; but fometimes it has a copious fediment mixed with fabulous concretions, and often apes a fit of the gravel. In the breaft there is a great ftraitnefs, a difficulty of breathing, and a fluttering and palpitation of the heart. As the difeafe increafes, the patient is troubled with the head-ach, a noife in the ears, with difficulty of hearing; the eyes are clouded, fome have double vifion, or a pain and drynefs of the eyes, and in the tongue a moft troublefome burning pain, fixed to a certain fpace, with a plentiful excretion of fpittle. At length the animal functions are impaired, the mind is difturbed on the moft trivial occafions, and is hurried into the moft perverfe commotions; the patient entertains wild and extravagant fancies, the memory grows weak, and the reafon fails. Some fymptoms affect the whole body, which is covered with blotches, or copious fweats; the ftrength decays, the limbs are languid and unapt for labour; the body becomes tabid, the joints are tormented fometimes with a blunt, and fometimes with a cutting pain; at laft, all the fecretions, efpecially the fanguineous, are perverted. In fhort, as Dr. Sydenham obferves, it imitates all kinds of diftempers fo exactly, as to require the utmoft fagacity of a phyfician, to diftinguifh it from an effential difeafe of any part.

The remote caufes of this diforder are an hereditary difpofition to it, a fedentary ftudious life, fadnefs, cares, trouble of mind, intenfe thinking on a fingle fubject, a cold and moift conftitution of the air; grofs, impure, flatulent diet; tedious difeafes, not rightly treated; the fuppreffion of the hæmorrhoids and menfes, and other periodical fluxes of the blood;

blood; hard labour in child-bearing, &c. Though hypochondriacs are never perfectly well, yet they are generally worst in the autumnal and winter seasons. Women generally suffer most about the time when their menses ought to flow. And it is worthy of observation, that those affected with this disease, are seldom attacked with continual epidemic, or contageous fevers, not even with the plague itself.

As to the prognostics, if the disease be recent, and left to itself, it is not dangerous; but if it be inveterate, and not skilfully treated, or a bad regimen is followed, it is attended with more grievous symptoms, and produces obstructions, and schirra of the viscera, a cachexy, a dropsy, an hectic, a convulsive asthma, an incurable melancholy or madness, &c. But if it be caused by a suppression of the menses, or bleeding piles, the disease will be cured by restoring the flux.

As continual fear and diffidence are symptoms of this disease, the patients are always foreboding terrible things, and live in constant dread, which renders them fickle, impatient, and prone to run from one physician to another; therefore, when a cure is attempted, they must be encouraged and persuaded to be patient, and then the following indications may be pursued: 1. To correct and evacuate the acid, viscid, bilious filth, and flatulent sordes from the primæ viæ, which yield continual fuel to this disease. 2. The spasms being appeased, to restore the natural order of the peristaltic motion of the intestines, and to recover it from a languid state, that there may be a due concoction of the aliment, a laudable chyle and other fluids generated. 3. To disperse the stagnated juices, in order to render the circulation of the blood equable through the abdomen and the rest of the body; and to free the fluids from all acrimony, after facilitating the excretions by urine, and through the skin. 4. And, lastly, to corroborate the whole nervous system.

To answer the first intention, nothing is better in the fit than clysters made with emollient herbs, water-gruel strained, camomile flowers, the tops of yarrow; the oils of sweet almonds, dill, camomile, linseed, &c. adding a carminative species made of carraway, dill, but more especially cumin-seeds. These should be repeated if the spasms render them ineffectual. Nor must gentle laxatives of manna, rhubarb, and cream of tartar be neglected. If there be a great deal of acid filth in the stomach, crab's eyes alone will purge. To correct the sordes in the primæ viæ, give the absorbent, precipitating, and antispasmodic powders, such as crab's eyes, mother of pearl, petrified nitre, prepared amber, cinnabar, tartar vitriolate, with a little castor. It will also be proper to take a decoction of any of the following things, in bed, to promote a diaphoresis, viz. balm, veronica, betony, daisy-flowers, camomile-flowers, fennel-seeds, &c.

To restore the digestive power of the stomach, give essence of orange-peel, tincture of tartar, dulcified spirit of nitre, &c. The paroxysms are relieved by a tepid pediluvia, made of wheat-bran, water and camomile-flowers, in which the feet should be put pretty deep.

Out of the fit, to discuss the stagnation of the blood, bleeding in the foot will be necessary, especially at the equinoxes, and at other times, as occasion shall require; but this should be after laxatives and pediluvia. If there be a disposition to an hæmorrhoidal flux, leeches should be applied every month; and the patient should also take balsamic pills, with antispasmodic nitrous powders.

To strengthen the nervous system, nothing is better than chalybeates; for they by a gentle astriction, restore the nerves their former strength. Outwardly, a saponaceous plaster, with camphire, may be laid to the hypochondria, with no small advantage.

In a thin bilious habit of body, a milk diet is good, if the first difficulty can be got over, *viz.* its coagulating in the stomach; otherwise it will not be sufficient to sustain the body in due strength. But nothing is more friendly, nor gives greater energy to the blood and spirits than moderate exercise, and particularly riding on horseback almost every day, and for a considerable time together: nor does riding in a coach want its salutary effects.

HYPOCYSTIS, in pharmacy, an inspissated juice, obtained from the sessile asarum, much resembling the true egyptian acacia. See the article ASARUM.

They gather the fruit, while unripe, and express the juice, which they evaporate over a very gentle fire, to the consistence of an extract, and then form

to çakes, and expofe them to the fun to dry.

Hypocyft is an aftringent, and that of confiderable power; it is good againft diarrhœas and hæmorrhages of all kinds, and may be ufed in repellent gargarifms in the manner of the acacia; but it is very rarely met with genuine in our fhops, the german acacia being ufually fold under its name.

HYPOGASTRIC, an appellation given to the internal branch of the iliac artery. See the articles ARTERY and ILIAC.

HYPOGASTRIC VEINS arife on each fide from the iliacs, and fend out branches to the rectum. See the article VEIN.

HYPOGASTRIUM, in anatomy, the lower part of the abdomen. See the article ABDOMEN.

HYPOPYON, in medicine, a collection of purulent matter under the cornea of the eye. See the article EYE.

As to the cure of an hypopyon, it fhould firft be attempted by violently fhaking the patient's head, in a fupine pofture, and preffing the eye before, with the fingers, in order to remove, or at leaft loofen the matter.

But if this proves unfuccefsful, the patient being feated as in the couching for a cataract, an incifion is made with a lancet, through the cornea, below the pupil, and about the fpace of a line from the white of the eye, and that large enough to difcharge the matter and aqueous humour; preffing the eye gently by the fingers, and taking care left you wound the uvea: then a comprefs, moiftened with a proper collyrium, is to be applied every third or fourth hour to the eye. If the matter be too thick to be difcharged, the needle, which is alfo employed for making fetons, is to be ufed. The inftruments fhould be wrapped up, fo that only the point be bare. In this cafe, St. Yves advifes to introduce a fmall probe, or inject fome cold water with a fyringe, and continue this till the whole pus be diffipated, after which the wound may be healed.

HYPORCHEMA, in the greek poetry, a poem, confifting of divers kinds of verfe, and of different lengths; but always full of fhort, or pyrrhichic feet.

HYPOSTASIS, among divines, fignifies a perfon, or fubftance; chiefly ufed in fpeaking of the perfons of the Trinity. See the article TRINITY.

HYPOSTASIS, in medicine, denotes the fediment of urine.

HYPOTHECA, in the civil law, the fame with mortgage in the common law. See the article MORTGAGE.

HYPOTHENAR, in anatomy, the abductor mufcle of the little finger. See the article ABDUCTOR.

HYPOTHENUSE, in geometry, the longeft fide A C (plate CXXXVII. fig. 2.) of a right-angled triangle A B C; or it is that fide which fubtends the right angle B. Euclid, lib. I. propofition XLVII. demonftrates, that, in every rectilinear right-angled triangle, the fquare of the hypothenufe A C (*ibid.*) is equal to the fquares of both the other fides A B, C B; or, that $AC^2 = AB^2 + CB^2$. This celebrated problem was difcovered by Pythagoras, who is faid to have facrificed a hecatomb to the Mufes, in gratitude for the difcovery.

HYPOTHESIS, in general, denotes fomething fuppofed to be true, or taken for granted, in order to prove or illuftrate a point in queftion.

An hypothefis is either probable or improbable, according as it accounts rationally or not for any phænomenon: of the former kind we may reckon the copernican fyftem and Huygens's hypothefis concerning the ring of faturn; and the ptolemaic fyftem may be efteemed an inftance of the latter. See the article COPERNICAN, &c.

Hypothefes, however elegant and artful, ought to be firft proved by repeated obfervations and conftant experience, before they are received as truths. See the article EXPERIMENTAL PHILOSOPHY.

HYPOTHETICAL PROPOSITIONS. See the article PROPOSITION.

HYPOTRACHELION, in architecture, denotes a little freeze in the tufcan and doric capitals, between the aftragal and annulets, called likewife colerin, gorgerin, &c. By fome it is applied to the neck of any column, or that part of the capital thereof, below the aftragal.

HYPOTYPOSIS, in rhetoric, fignifies a lively defcription.

HYPOZOMA, in anatomy, a membrane that feparates two cavities: fuch is the diaphragm.

HYPSILOIDES, in anatomy, the fame with the os hyoides. See the article HYOIDES.

HYRNENOPTERA, in zoology, a clafs of infects of the order of the tetraptera, with wings merely membranaceous, compofed of a fine thin fubftance, without any remarkable nerves. See the article TETRAPTERA.

HYSSOP, *hyffopus*, in botany, a genus of the didynamia-gymnofpermia clafs of plants, the flower of which is monopetalous and ringent, the upper lip being erect, roundifh, and emarginated, and the lower one divided into three fhort fegments, the middle one of which is hollow and cordated; the flower is fucceeded by four fmall feeds, which are roundifh and of a brown colour. See plate CXXXIX. fig. 3.

Hyffop is attenuant and difcutient, and is recommended in diforders of the lungs, when they are loaded with a foul and thick matter; it ftrengthens the ftomach and affifts digeftion; and by its acrimony, and power of attenuating the vifcous matter in the lungs, promotes expectoration, and is therefore good in afthmas: its good effects in the ftomach are of the fame kind, depending on its attenuating and abfterging the vifcous phlegm lodged there, which impedes the difcharge of its proper functions. It is alfo good in difeafes of the head.

It is beft taken in infufion, in the manner of tea, not made fo ftrong as to be difagreeable to the palate, and often repeated. A fimple water of it, which retains much of its tafte, fmell, and virtues, is kept in the fhops; they ufed alfo to have a fyrup of it, but that has of late been difregarded.

Externally, hyffop is greatly recommended in bruifes; the blacknefs fettling under the eyes from blows is carried off very readily by a cataplafm of the leaves, or only a little bundle of them fewed up in a linen-rag, and applied to the part: and Ray gives us an account from Mr. Boyle, of a violent contufion of the thigh, from the kick of a horfe, very happily cured by this herb, boiled as a cataplafm; he tells us, the violent pain was almoft inftantly removed, and the very mark and blacknefs taken off in a few hours.

HYSTERICS, or HYSTERIC PASSION, in medicine, a fpafmodico-convulfive affection of the nervous fyftem, proceeding from the womb, and caufed by the retention or corruption of the blood and lymph in its veffels; and more or lefs infecting the nervous parts of the whole body, by means of the nerves of the os facrum, the loins, and the whole fpinal marrow.

Hoffman, contrary to the fentiments of Willis, will not allow the uterus to be a nervous part; for he affirms that the hyfteric paffion, which is attributed to a vice in the womb, is owing to fpaftic, convulfive, and epileptic diforders, all which arife from a fault of the genus nervofum. But Aftruc obferves, that the effects of impreffions are various, according to the degree of their intenfity: thus, tickling the nofe with a feather, will caufe fneezing; of the fauces, vomiting; while a violent impreffion only caufes fimple pain; which is the cafe of the uterus in the hyfteric paffion: for the caufes of this difeafe, from obfervation, are the preternatural ofcillations of the uterine arteries, on the approach of the menfes, or their fuppreffion, when they are diftended with blood; an irritation of the uterus from the fluor albus; various tumours in the uterus; the acrimony of the feminal fluids. Thefe affections of the uterus draw the other parts into confent, as poifons in the ftomach produce convulfions, a fyncope, and fweats. This difeafe has been very improperly confounded with the hypochondriac paffion: for a ftrangulation of the fauces, an intercepted breathing even to fuffocation, a fainting away, a lofs of voice, a profound fleep, are the true, proper, and effential figns and fymptoms of this uterine difeafe.

An hyfteric fit is, according to Hoffman, generally preceded with a preffing pain of the forehead, temples, or eyes, with an effufion of tears, a dimnefs of fight, a dulnefs of the mind and fenfes, a loathing of all things. When the fit comes on, the patient is exceeding coftive, and yet has a ftrong ftimulus to difcharge her urine, which is as clear as water; the breathing is uneafy, difficult, and fhort; and a languor feizes the whole body: to thefe fucceed a pain in the loins, a great fhivering and fhaking; the belly is hard and inflated; afterwards the navel is drawn inwards, and outwardly leaves a great pit; then they feel a fort of a globe arife from the lower part of the belly to the hypochondria and diaphragm; foon after the heart begins to flutter and beat with a hard, unequal, and fometimes intermitting pulfe; the extreme parts grow cold, the fauces are ftraitened, the face pale, the breathing exceeding difficult, the

the voice ceases, the pulse is almost imperceptible, and there is such a stricture of the belly that no flatus can be emitted, nor no clyster given. In some there are convulsions of the head and limbs; others lie in a profound sleep, without sense or motion; others have their face and neck look red and inflamed, with a strong pulse; and others again break out into immoderate laughter, and regaining their voice, say a great many silly things.

When they begin to come to themselves, the pulse, which was before weak, languid, and obscure, becomes brisk, soft, and strong; heat returns to the extreme parts, the face looks ruddy, the wind forces its way upwards, there is a rumbling in the belly, and at length the patients, waking as it were out of a profound sleep, have their voices, senses, and motion restored; yet they complain of a heavy pain in the head, a languor of the body, feet, and thighs. Some have continued in a fit so long, that they have been laid out for dead.

The hysteric passion attacks women that are pregnant, or in child-bed; widows that are full of blood, after some grievous passion of the mind; or maids, after a sudden suppression of the menses.

This disease, according to the last mentioned writer, may be caused by whatever promotes a more plentiful afflux of the blood and genital fluid of the uterine parts, or impedes the eruption of the menses, or occasions their suppression: hence maids and widows are most subject thereto; also women of a sanguine and bilious constitution, who live high, drink generous wines, feed on high-seasoned aliment, and are subject to violent passions and commotions of the body and mind: on the other hand, those who live a sedentary life, feed on coarse, acid, low diet, who have omitted usual bleeding, who are oppressed with sorrows, cares, and disappointments, are liable to this disease; for by these the blood is thickened, the solid parts weakened, and consequently the flowing of the menses rendered more difficult. Likewise, sudden terror, and the body being exposed to uncommon cold during the time of the menstrual flux, by giving it a check, procure hysteric spasms. Some are subject to the same disorder from the smell of perfumes.

However dreadful and cruel this disease may appear, yet it is not very dangerous in itself, unless ill managed, or the patient be exceeding weak and valetudinary: it is most apt to turn into convulsions and an epilepsy.

In the cure, it must be carefully observed, whether the woman is plethoric, or exhausted of blood and strength. In the former case, the spasms or convulsions are more violent and copious; bleeding is a present help, and many have been brought to themselves who were seemingly dead, if the florid colour of their face had not shewn to the contrary.

In the fit it will be proper to apply fetid things to the nose, such as asa fœtida, preparations of castor, partridges feathers burnt, &c. For women in child-bed, a girdle made of russia leather, and bound pretty tight, is excellent. Likewise clysters made with roots and seeds of lovage, which are specifics, camomile flowers, elder-flowers, veronica, the carminative seeds boiled in whey; to which may be added oil of elder, dill, or camomile. Externally plasters made of opopanax, bdellium, galbanum, sagapenum, and asa fœtida, may be applied to the navel. Some greatly recommend fumigations for the uterus, of musk, civet, storax, and benjamin.

Inwardly, the patient may take thirty or forty drops of tincture of castor, in cold water; or if she can swallow them, the following pills: take myrrh, sagapenum, opopanax, asa fœtida, saffron, and the theriaca andromache, of each half a dram; adding sometimes six or eight grains of camphire and laudanum opiatum. From each scruple of this must ten pills be made, two of which are to be taken every hour, with a due quantity of water of camomile-flowers.

Some hysterical disorders, according to Dr. Mead, observe the lunar phases, and partake of the nature of an epilepsy: they seldom require bleeding, and purging should be used with caution. Emetics are of greater service, especially a little before the fit. In the fit, the Dr. observes, the best medicines are those which repair the loss of spirits, as russian castor, gum ammoniac, and salt of amber, in pills. Take gum ammoniac, two drams; russian castor, one dram; salt of amber, half a dram; with a sufficient quantity of the peruvian balsam: make this mass into small pills, and let the dose, which is one scruple, be repeated as occasion requires.

Out

Out of the fit, he prefcribes native cinnabar, and wild valerian-root, as moft proper for correcting the juices.

To prevent its degenerating into a chronic difeafe, particularly the hypochondriac paffion, Hoffman advifes, that care fhould be taken to keep the menfes regular, which muft be done by balfamics, compofed of myrrh and amber, with bitter and carminative extracts, efpecially zedoary and orange-peel, made into an elixir with a moderately fpirituous menftruum: this frequently helps the digeftion, and promotes a regular menftrual difcharge.

But it is neceffary to obferve, that, in hyfteric cafes, the fame remedies have a different effect on different women: fome cannot bear fetid medicines, which to others are an immediate relief: fome have fallen into a terrible fyncope, and have come to themfelves by fprinkling cold water on the face, when more powerful and fpirituous things have failed. Others cannot endure hot things inwardly, nor outwardly, as baths, fomentations, liniments, and nervous applications. Anodynes and opiates, which procure eafe and reft to fome, are very injurious to others who are greatly debilitated, and whofe nerves are weak. Some have recovered from a violent paroxyfm by a draught of cold water, which given to others has increafed the diforder.

When purging is neceffary, it will be beft to prefcribe currants, well faturated with a gentle decoction of rhubarb.

Sydenham prefcribes the peruvian bark, morning and evening, in a fcruple at a time, as an excellent remedy in hyfteric convulfions.

In the fits, befides the remedies already mentioned, Aftruc recommends a few grains of civet, or mufk, alone, or tied in a thin rag, and introduced into the vagina, which helps to difcharge the morbid and noxious humours of the uterus. Out of the fit, he obferves that mirth and exercife have alone often cured this diftemper. The beft remedies are caftor, afa fœtida, galbanum, fagapenum, and myrrh; five grains in powder is a dofe, or ten drops of the tinctures; as alfo gentle purges of caffia, manna, or infufion of fenna.

HYSTERIC COLIC, a common fymptom of the hyfteric paffion, attended with a moft violent pain about the pit of the ftomach; as alfo with a vomiting of a greenifh humour, and great finking of the fpirits. After a day or two the pain goes off, but upon the flighteft motion or perturbation of the mind it foon returns again.

Neither bleeding nor cathartics have any place in the cure. According to Sydenham, it will be proper firft to advife the patient to drink upwards of a gallon of poffet-drink, to clear the ftomach of its impurities, by throwing it up again, that the paregoric may not be hindered; afterwards give twenty-five drops of the thebaic tincture, in an ounce of the fpirit of cinnamon-water. This laft is to be repeated, at due intervals, till the fymptoms difappear; that is, the effect of one dofe muft be known, before another is given: yet fometimes in plethoric bodies, if the ftrength will permit, it is better to prepare the way by bleeding and purging, or both, for an anodyne.

But if the hyfteric colic comes on by fits, the following may be ufed in the intervals, or when the fit is off: take large dofes of the balfam of Peru, that is, twenty, thirty, or forty drops, in a fpoonful of the fineft and whiteft fugar: this may be taken twice or thrice in a day.

HYSTEROLOGY, the fame with hyfteron proteron. See the next article.

HYSTERON PROTERON, in grammar and rhetoric, a fpecies of the hyperbaton, wherein the proper order of conftruction is fo inverted, as that the part of any fentence which fhould naturally come firft is placed laft, as in this of Terence, *valet & vivit*, for *vivit & valet*; and in the following of Virgil, *moriamur & in media arma ruamus*, for *in media arma ruamus & moriamur*.

HYSTEROPOTMI, ὑστεροποτμοι, in grecian antiquity, the fame with deuteropotmi. See the article DEUTEROPOTMI.

HYSTEROTOMIA, ὑστεροτομια, in anatomy, an anatomical diffection of the uterus or womb. See the article UTERUS.

HYSTEROTOMOTOCY, ὑστεροτομοτοκια, among chirurgical writers, the fame with the cæfarian fection. See CÆSARIAN.


Fig. 1. JACK.
A
C
S
b
N°. 1.
P
H
B
A
N°. 2.
P
H
B
Fig. 2. JACKALL.
Fig. 3. JASMINE.
Fig. 4. IBEX.

I.

I or i, the ninth letter, and third vowel of the alphabet, is pronounced by throwing the breath suddenly against the palate, as it comes out of the larynx, with a small hollowing of the tongue, and nearly the same opening of the lips and talk as in pronouncing *a* or *e*. Its sound varies; in some words it is long, as *high*, *mind*, &c. in others short, as *bid*, *hid*, *sin*, &c. in others again, it is pronounced like *y*, as in *collier*, *onion*, &c. and in a few, it sounds like *ee*, as in *machine*, *magazine*, &c. No english word ends in *i*, *e* being either added to it, or else the *i* turned into *y*.

But besides the vowel, there is the jod consonant; which because of its different pronunciation, has likewise a different form, thus J, j. In english, it has the soft sound of *g*; nor is used, but when *g* soft is required before vowels, where *g* is usually hard: thus we say, *jack*, *jet*, *join*, &c. instead of *gack*, *get*, *goin*, &c. which would be contrary to the genius of the english language. See the article ENGLISH.

I, used as a numeral, signifies no more than one, and stands for so many units as it is repeated times: thus I, one; II, two; III, three, *&c.* and when put before a higher numeral, it substracts itself, as IV, four; IX, nine, *&c.* but when set after it, so many are added to the higher numeral, as there are I's added: thus VI is 5 + 1, or six; VII, 5 + 2, or seven; VIII, 5 + 3, or eight. The antient Romans likewise used IƆ for 500, CIƆ for 1000, IƆƆ for 5000, CCIƆƆ for 10,000, IƆƆƆ for 50,000, and CCCIƆƆƆ for 100,000. Farther than this, as Pliny observes, they did not go in their notation; but when necessary, repeated the last number, as CCCIƆƆƆ, CCCIƆƆƆ for 200,000; CCCIƆƆƆ, CCCIƆƆƆ, CCCIƆƆƆ for 300,000; and so on.

I, used as an abbreviature, is often used for the whole word Jesus, of which it is the first letter.

JAAR, a river of the bishopric of Liege, which falls into the Maes, at Maestricht.

JABAJAHITES, a modern sect of Mahometans, who teach that the knowledge of God extends not to all things, but is perfected by experience; and that he governs the world according to the course of contingent events, as not having had from eternity a perfect knowledge of all things future. This doctrine is looked upon, by the other mussulmen, as impious and blasphemous.

JABLUNKA, a town of Silesia, in the territory of Teschen: east long. 18°, north lat. 49° 37′.

JACCA, a city and bishop's see of Arragon, in Spain, sixty miles north of Saragossa: west long. 50′, and north lat. 42° 50′.

JACENT, a term applied by Helmont to nature, when a disease is risen to a head, and the morbific matter strives to suppress the vital flame.

JACK, in mechanics, an instrument of common use for raising heavy timber, or very great weights of any kind. See plate CXLII. fig. 1. n° 1.

But as the wheel-work of it is shut up in the strong piece of timber C B, we have given a representation of it (*ibid.* n° 2.) where you must suppose the rack A B at least four times as long in proportion to the wheel Q, it being here so much contracted; and the teeth, which will then be four times more in number, to be contained about three in an inch. Then if the handle H P be seven inches long, five turns of it, that is five times twenty-two inches, or 110 inches, will be the velocity of the power; whilst the weight raised by the claw A, or depressed by the claw B, moves one inch; for as the pinion of the handle has but four leaves, and the wheel Q twenty-three, there must be five revolutions of the handle to turn the wheel once round; whose three-leaved pinion, R, will in that revolution just move the rack A B three teeth or one inch.

This might have been also known without seeing, or even knowing, the number of the teeth of the wheel and pinions, by measuring a revolution of the handle in n° 1. and comparing the space gone through by it with the space gone through by the ends of the rack A or B.

Sometimes this machine is open behind, from the bottom almost up to the wheel

Qr

Q, to let the lower claw, which in that case is turned up at B, draw up any weight; and when this is effected to a sufficient height, it is prevented from falling down again by putting the end of the hook S (*ibid.* n° 1.) fixed to a staple, over the curved part of the handle at *h*.

All parts of this machine must be made very strong, but chiefly those which immediately sustain the weight.

The common kitchen jack is a compound engine; where the weight is the power applied to overcome the friction of the parts, and the weight with which the spit is charged; and a steady and uniform motion is obtained by means of the fly. See the article FLY.

Smoke JACK. See SMOKE JACK.

JACK-WAMBASIUM, in our old writers, a kind of defensive coat-armour, worn by horsemen in war, not made of solid iron, but of many plates fastened together, which some persons by tenure were bound to find upon any invasion.

JACK, in ichthyology, a name sometimes given to the lucius or pike. See the article LUCIUS.

JACK-FLAG, in a ship, that hoisted up at the sprit-sail top-mast head. See FLAG.

JACK-DAW, in ornithology, a species of corvus, with a black and grey head, a brownish black body, and the wings and tail black.

It is one of the smallest of the crow-kind, but an erect and well-shaped bird. See the article CORVUS.

JACKALL, in zoology, an animal of the dog-kind, with a slender snout. See the article CANIS.

It is a very beautiful creature, and so like a dog, as to be mistaken at first sight for some mungrel breed of that animal. See plate CXLII. fig. 2.

Its size is that of a small hound; and, in the East, where it is a native, there are vast packs of them, often more than 200 in a company, which hunt animals they would never dare to attack single. It is not impossible that lions and other beasts of prey may be alarmed by the cries of these animals in their chace, and fall in and rob them of their prey; but the general opinion of their attendance on the lion, is fabulous.

JACOB'S STAFF, a mathematical instrument otherwise called cross staff. See the article CROSS-STAFF.

JACOBINE, or JACK, in ornithology, a very small sort of pigeon, with a range of feathers inverted quite over the hinder part of the head; bearing some resemblance to a friar's hood, whence the name.

JACOBINE MONKS, the same with the dominicans. See DOMINICANS.

JACOBITES, a term of reproach bestowed on the persons, who vindicating the doctrines of passive-obedience and non-resistance with respect to the arbitrary proceedings of princes, disallow of the late revolution, and assert the supposed rights, and adhere to the interests of the late abdicated king James and his family.

JACOBITES, in church-history, a sect of christians in Syria and Mesopotamia; so called either from Jacob, a Syrian, who lived in the reign of the emperor Mauricius; or from one Jacob, a monk, who flourished in the year 550.

The jacobites are of two sects, some following the rites of the latin church, and others continuing separated from the church of Rome. There is also at present a division among the latter, who have two rival patriarchs, one of whom resides at Caramit, and the other at Derzapharan. As to their belief, they hold but one nature in Jesus Christ; with respect to purgatory and prayers for the dead, they are of the same opinion as the Greeks, and other eastern christians: they consecrate unleavened bread at the eucharist, and are against confession, believing that it is not of divine institution.

JACOBITE MONKS, religious, of the sect of jacobites, in Armenia, Mesopotamia, &c.

JACOBUS, an antient gold coin worth twenty-five shillings. See COIN.

JADE-STONE, the name given to a hard, greyish-green species of jasper, of which the Turks generally make the handles of the sabres of great people. See the article JASPER.

JAFFA, antiently called JOPPA, is a port-town of Palestine in asiatic Turky, situated thirty miles north-west of Jerusalem: east long. 36°, north lat. 32° 20′.

JAFNAPATAN, a port-town at the north end of the island of Ceylon, in the East Indies; subject to the Dutch: east long. 79°, north lat. 10°.

JAGENDORF, a city of Silesia, twelve miles north-west of Tropaw: east long. 17° 6′, north lat. 50° 8′.

St. JAGO, the chief of the Cape Verd islands, in Africa, 300 miles west of Cape Verd; subject to Portugal: west long. 24°, north lat. 15°.

St. JAGO, the capital of the island of Cuba, 100 miles north-west of Jamaica: west long. 76° 30′, north lat. 20°.

St. JAGO, the capital of the province of Chili, in South America, situated six miles west of the mountains of Andes, and eighteen east of the Pacific ocean: west long. 77°, south lat. 34°.

JAGO DE LA VEGA, or Spanish Town, the capital of Jamaica, situated at the south-east part of the island, about seven miles north-west of Port Passage and the bay of Port Royal: east long. 76° 30′, north lat. 18° 20′.

JAGODNA, a town of european Turky, in the province of Servia, situated on the river Moraw: east long. 22°, north lat. 43° 20′.

JAICZA, a city of european Turky, in the province of Bosnia, fifty miles north-east of Bosnaseraio: east long. 18°, north lat. 45° 5′.

JAIL, or GAOL. See GAOL.

JALAP, *jalapa*, in botany, a plant of the pentandria-monogynia class, called by Linnæus mirabilis. See MIRABILIS.

Jalap root is compact and firm, of a wrinkled surface, and of the deepest brown colour within, most disagreeable to the taste, and which takes fire most readily, and burns most briskly when held to the flame of a candle.

With us it is of use in extemporaneous prescription, given in the form of boluses and draughts. Its dose is from twenty to thirty or thirty-five grains. Its common correctives are ginger and cream of tartar; but nature has indeed prepared it so well to our hands, that it needs no addition. The best method of giving it is in a draught made with white-wine, and prepared at least twelve hours before the time when it is to be taken; in which case, the wine has power to open the body of the medicine, and prepare it for acting with the greater ease.

It is an excellent purgative in dropsical and all other cases where serous humours are to be evacuated. The only caution necessary in the use of it is, that it should not be given in acute fevers, nor to persons of dry and hot constitutions; for in these cases, it is liable to the same mischiefs as other acrid purgatives, and will sometimes bring on heat and inflammations in the viscera.

The preparations of jalap in use with us, are a tincture, an extract, and a resin.

To prepare the tincture, take of the root of jalap, eight ounces, put it into a quart of proof-spirit, and after digestion strain off the spirit.

This tincture purges briskly, and is of use in all cases where the root in substance is proper; its dose is from half a dram to two drams.

The extract is made thus: pour upon jalap-root powdered, rectified spirit of wine, and with a due heat draw a tincture, then boil the residue several times in water: after straining, draw off the spirit from the first tincture till it begins to thicken; inspissate also the strained decoctions; then mix the two extracts, and with a gentle fire reduce them to the consistence of a pill.

The two extracts will thus unite into an uniform mass, and retain all the virtues of the root. This extract is of the same virtue as the former tincture, and its dose is from ten to twenty grains.

To prepare the resin, take any quantity of the root of jalap well bruised, pour on it as much spirit as will rise four inches above the root, digest them in a sand heat till the tincture is extracted; filtrate the tincture; then distil off one half of the spirit; pour to what remains a sufficient quantity of water, and the resin of the jalap will be precipitated to the bottom in the form of turpentine. Wash it several times in fresh water, and dry it for use by a very gentle heat.

This purges the most violent of all the preparations of jalap; its dose is from ten to twelve grains; but the extract is greatly preferable to it on all occasions.

JALOFFS, a country and people of Africa, lying on the north side of the river Gambia, near its mouth: west long. 14°, north lat. 13° 40′.

JAM, or JAMB, among carpenters, &c. See the article JAMB.

JAMAGOROD, a town of the province of Ingria, in Russia, situated twelves miles south east of Narva: east long. 28°, north lat. 59° 15′.

JAMAICA, an island of America, situated in the Atlantic ocean, between 76° and 79° of west longitude, and between 17° and 18° odd minutes north latitude, near 5000 miles south-west of England, 100 miles south of the island of Cuba, and 350 miles north of Terra Firma. The island lies east and west, and is about 140 miles long, and 60 broad. The wind sets on the shore almost all the day in every part of the island, and off the shore in the night; it sometimes hails, but the people there never see frost or snow. The produce of the island is chiefly sugar, but there is plantations of coffee, of the cocoa or chocolate tree, of indico, tobacco, pepper,

pepper, cotton, woods for dying, and the mahogany and machineel wood, ginger, medicinal drugs and gums. The common difeafes of the country are fevers, fluxes, and the dry gripes.

JAMAICA PEPPER, *pimenta*, in the materia medica. See the article PIMENTA.

JAMAICA-WOOD, a name fometimes given to brazil. See the article BRAZIL.

JAMANA, the chief town of a province of Arabia, alfo of the fame name; eaft long. 47° 15′, north lat. 25°.

JAMB, or JAUMB, among carpenters, an appellation given to door-pofts, as alfo to the upright pofts at the fides of window-frames.

JAMBS, among bricklayers, &c. denote the upright fides of chimnies, from the hearth to the mantle-tree.

JAMBA, a city of the hither India, and the capital of the province of the fame name, fituated 220 miles north-eaft of Delli: eaft long. 82°, north lat. 31°.

IAMBIC, in antient poetry, a fort of verfe, fo called from its confifting either wholly, or in great part, of iambus's. See the article IAMBUS.

Ruddiman makes two kinds of iambic, *viz.* dimeter and trimeter; the former containing four feet, and the latter fix. And as to the variety of their feet, they confift wholly of iambus's, as in the two following verfes of Horace.

	1	2	3	4	5	6
Dim.	*Inar*	*fit æ*	*ftuo*	*fius*		
Trim.	*Suis*	*& i*	*pfa ro*	*ma vi*	*ribus*	*ruit.*

Or, a dactylus, fpondeus, anapæftus, and fometimes tribrachys, obtain in the odd places; and the tribrachys alfo in the even places, excepting the laft. Examples of all which may be feen in Horace, as:

Dimeter.

1 2 3 4 5 6
Canidi|a tra|ctavit|dapes|
Vide|reprope|rantes domum|

Trimeter.

Quò quò|fcele|fti rui|tis aut|cur dex|teris.
Prius|que cœ|lum fi|det in|ferius|mari.
Aliti|bus at|que cani|bus homi|cid' he|ctorem.
Pavidum|que lepo|r aut ad|venam|laqueo|gruem.

JAMBOLIFERA, in botany, a genus of the octandria-monogynia clafs of plants, the flower of which confifts of four petals, and is of an infundibuliform fhape.

JAMBUS, in antient poetry, a fimple foot confifting of a fhort and a long fyllable, as *pios*. See the article FOOT.

JAMBY, a town on the eaft fide of the ifland of Sumatra, in the Eaft Indies, fituated in 101° eaft long. and in 1° 30′ fouth lat.

JAMES, or *knights of St.* JAMES, a military order in Spain, firft inftituted about the year 1170, by Ferdinand II. king of Leon and Galicia. The greateft dignity belonging to this order is grand mafter, which has been united to the crown of Spain. The knights are obliged to make proof of their defcent from families that have been noble for four generations, on both fides: they muft alfo make it appear that their faid anceftors have neither been Jews, Saracens, nor Heretics; nor have ever been called into queftion by the inquifition. The novices are obliged to ferve fix months in the galleys, and to live a month in a monaftery; they obferve the rule of St. Auftin, making no vows but of poverty, obedience, and conjugal fidelity.

St. JAMES's DAY, a feftival of the chriftian church obferved on the 25th of July, in honour of St. James the greater, fon of Zebedee.

Epiftle of St. JAMES, a canonical book of the New Teftament, being the firft of the catholic or general epiftles; which are fo called, as not being written to one but to feveral chriftian churches.

This general epiftle is addreffed partly to the believing and partly to the infidel Jews; and is defigned to correct the errors, foften the ungoverned zeal, and reform the indecent behaviour of the latter; and to comfort the former under the great hardfhips they then did, or fhortly were to fuffer, for the fake of chriftianity.

JAMES TOWN, once the capital of Virginia in America, and of James-county, fituated in a peninfula on the north fide of James, or Pouhatan river, in weft longitude 76° 30′, north lat. 37° 30′.

JAMPNUM, a word formerly ufed in fines of lands, &c. where it denotes gorfy ground: it is fuppofed to be derived from the french *jaune*, yellow; becaufe the flowers of furze or gorfe are of of that colour.

JANEIRO, a province of Brazil, in South America, fituated between 44° and 49° of weft long. and between the tropic of capricorn and 22° of fouth lat.

JANIKAW, or JANOWITS, a town of Bohemia, fituated forty-five miles fouth-eaft of Prague.

JANITOR, in anatomy, a name used by some affected writers for the pylorus. See the article PYLORUS.

JANITRIX, in anatomy, a name given to the vena portæ. See VENA.

JANIZARIES, an order of the turkish infantry, reputed the grand signior's guards, and the main strength of the ottoman army.

The janizaries were at first composed only of the sons of christians, delivered up as a tribute by their parents, in return for the privilege of enjoying liberty of conscience; and were taken at twelve years of age, to the end that forgetting their country and religion, they might know no other parent besides the sultan. Of late, however, this custom has been left off, the fine for the free exercise of their religion being generally paid in money.

Their dress, which is given them by the grand signior every year, on the first day of ramazan, is a long vest with short sleeves, which they tie about their waists with a linen-sash striped with many colours, and adorned at both ends with gold or silver fringe, and over this they wear a loose upper vest of blue cloth. They wear no turban, but instead of it a felt cap, and a long hood of the same stuff, which hangs over their shoulders; and on days of ceremony, they adorn themselves with long feathers stuck in a case in the front of their bonnets. The arms of the janizaries in Europe are, in time of war, a fusil, or a musquet, and a cartouch-box, which hangs at their left side: but in Asia, where powder and fire-arms are more scarce, they carry a bow and arrows with a poignard.

Their pay is from two aspers a day to twelve; for when they perform some important service, or have children, their pay is increased. All the turkish infantry are at present generally called by the name of janizaries, but such only are really so, who derive their institution from Ottoman I. and their peculiar privileges from Amurath III. which do not amount to above 25000 men: however, their being exempted from the payment of taxes, and the performance of public duties, induce abundance of persons to bribe the officers to take them under their protection, and to make them pass for janizaries, without receiving any pay. By means of this intermixture of the real janizaries with those admitted by corruption, their number at present amounts to above 100,000. And yet not accounting any but such as are effectively janizaries, their body has sometimes been so formidable as to dethrone the ottoman monarchs, and suddenly to change the whole face of the empire.

JANIZARIES, are also certain officers at Rome, otherwise called participantes, by reason of certain rights or dues which they enjoy in the annates, bulls, or expeditions of the Roman chancery. Most authors are mistaken in the nature of their office: the truth is, they are officers of the third bench, or college, of the Roman chancery: the first bench consists of writers, the second of abbreviators, and the third of janizaries, who are a kind of correctors, or revisors, of the pope's bulls.

JANNA, a town of european Turky, the capital of a province of the same name, being the antient Thessaly, situated east long. 22°, north lat. 39°.

JANSENISTS, in church-history, a sect of the roman catholics in France, who follow the opinions of Jansenius, bishop of Ypres, and doctor of divinity of the universities of Louvain and Douay, in relation to grace and predestination.

In the year 1640, the two universities just mentioned, and particularly father Molina and father Leonard Celsus, thought fit to condemn the opinions of the jesuits on grace and free-will. This having set the controversy on foot, Jansenius opposed to the doctrine of the Jesuits the sentiments of St. Augustine, and wrote a treatise on grace, which he entitled Augustinus. This treatise was attacked by the jesuits, who accused Jansenius of maintaining dangerous and heretical opinions; and afterwards, in 1642, obtained of pope Urban VIII. a formal condemnation of the treatise wrote by Jansenius: when the partisans of Jansenius gave out that this bull was spurious, and composed by a person entirely devoted to the jesuits. After the death of Urban VIII. the affair of jansenism began to be more warmly controverted, and gave birth to an infinite number of polemical writings concerning grace; and what occasioned some mirth, was the titles which each party gave to their writings: one writer published, The torch of St. Augustin, another found snuffers for St. Augustin's torch, and father Vernon formed a gag for the jansenists, *&c.* In the year 1650, sixty-eight bishops of France subscribed a letter

to pope Innocent X. to obtain an enquiry into, and condemnation of the five following propofitions, extracted from Janfenius's Auguftinus: I. Some of God's commandments are impoffible to be obferved by the righteous, even though they endeavour, with all their power, to accomplifh them. II. In the ftate of corrupted nature, we are incapable of refifting inward grace. III. Merit and demerit in a ftate of corrupted nature, does not depend on a liberty which excludes neceffity, but on a liberty which excludes conftraint. IV. The femipelagians admitted the neceffity of an inward preventing grace for the performance of each particular act, even for the beginning of faith, but they were heretics in maintaining that this grace was of fuch a nature, that the will of man was able either to refift or obey it. V. It is femipelagianifm to fay, that Jefus Chrift died, or fhed his blood, for all mankind, in general.

In the year 1652, the pope appointed a congregation for examining into the difpute in relation to grace. In this congregation Janfenius was condemned, and the bull of condemnation, publifhed in May 1653, filled all the pulpits in Paris with violent outcries and alarms againft the herefy of the janfenifts. In the year 1656, pope Alexander VII. iffued out another bull, in which he condemned the five propofitions of Janfenius. However, the janfenifts affirm, that thefe propofitions are not to be found in his book; but that fome of his enemies having caufed them to be printed on a fheet, inferted them in the book, and thereby deceived the pope. At laft Clement XI. put an end to the difpute by his conftitution of July 17, 1705; in which, after having recited the conftitutions of his predeceffors in relation to this affair, he declares, "That in order to pay a proper "obedience to the papal conftitutions "concerning the prefent queftion, it is "neceffary to receive them with a re- "fpectful filence." The clergy of Paris, the fame year, approved and accepted this bull, and none dared to oppofe it.

This is the famous bull *unigenitus*, fo called from its beginning with the words *unigenitus dei filius*, &c. which has occafioned fo much confufion in France.

JANUARY, in chronology, the firft month of the year, fo called from Janus, one of the antient roman deities, painted with two faces; one whereof was fuppofed to look towards the new year, and the other towards the old.

This month contains thirty-one days, and was introduced into the year by Numa Pompilius, Romulus's year beginning in the month of March. The chriftians heretofore fafted on the firft day of January, by way of oppofition to the fuperftition of the heathens, who, in honour of Janus, obferved this day with feaftings, dancings, mafquerades, &c. See the article YEAR.

JAPAN, or *iflands of* JAPAN, are fituated between 130° and 144° of eaft longitude, and between 30° and 40° north latitude.

JAPAN-EARTH, *catechu*, in the materia medica. See the article CATECHU.

JAPANNING, the art of varnifhing and drawing figures on wood, &c. in the manner as is done by the natives of Japan.

This method of preparing woods for japanning is as follows. 1. Take plafterer's fize, diffolve it over the fire, and mix it with whiting finely powdered, till it is of a good body, but not too thick. 2. By means of a ftrong brufh lay your work over with the former mixture, and letting it dry very well, repeat this till the wood is perfectly plain, or the pores and crevices fufficiently filled up; and when it is thoroughly dry, rub the work over with a wet rag till it is rendered as fmooth as poffible: this work is called water-planing. 3. After this, wafh over the work with the thickeft of feed-lac varnifh till it is very fmooth, letting it ftand to dry between every wafhing. 4. In a day or two's time, you may varnifh it over with black, or whatever other colour you defign, and when it is dry, finifh it by polifhing. See the article VARNISH.

After the fame manner carved figures are to be primed, alfo frames, cabinets, ftands, tea-tables, &c. faving that thefe are not to be polifhed, and therefore do not require fo great a body of varnifh; but for the tops of tables, boxes, fides of cabinets, &c. when the wood is ordinary and rough grained, as deal, oak, &c. you may ufe common joiners glue, diffolved in water till it is fine and thin, into which put the fineft faw-duft, till it is indifferently thick: then with a brufh lay your wooden work over with it, and when it is dry, repeat it fo often till all the roughnefs and grain of the wood is fufficiently hidden; and two or three days

days after let it be ſcraped with a ſcraper, as pear-tree and olive-wood are done, to make it as ſmooth as poſſible: then varniſh it as before directed. This if well done might not come behind any other work either for beauty or durability; but, however, thoſe woods that are firm and cloſe-grained, are chiefly to be choſen.

Method of taking off japan patterns. 1. Having laid your ground, whether black, or of any other colour, and rendered it fit for drawing; and having your draught or deſign before you on paper, either drawn or printed, do as follows. 2. Rub this draught or print all over the back ſide with whiting, or fine chalk; wiping off all that whiting which lies looſe upon the paper, then laying this paper upon the table, or piece of varniſhed work, with the whited ſide next it upon the very place where you would have that figure made, with a needle, not ſharp pointed, fixed in a wooden handle, and called a tracing-pencil, go over and trace as much of the drawing as you think proper: thus, by means of the whiting, you will have the groſs form of the draught, and ſuch other lines as will be a direction to you how to perform what you would have done. 3. Having done this, if you draw in gold-ſize, uſe fine cinnabar mixt with gum-water, and with a ſmall pencil dipt into it, go over all the lines made by the chalk: this will hold it ſo as not to come off. 4. If you work your metals or colours in gum-water, then trace over your deſign with gum-water mixt with gold or braſs-duſt, by either of theſe ways when it is dry and finiſhed, *viz.* either in gum-water or gold-ſize, you may complete and finiſh your work.

Method of japanning wood. The wood being prepared as before directed, it is japanned with black, as follows. 1. Take of the thickeſt lack-varniſh, ſix ounces: and lamp-black, enough to colour it: with this waſh over your piece three times, letting it dry thoroughly between each time: again, with the ſame varniſh, waſh it over three other ſeveral times, letting it dry as before, and ruſh it ſmooth between each waſhing. 2. Then take the following: of thickeſt ſeed-lac varniſh, ſix ounces; and venice turpentine, one ounce; waſh over your work with it ſix times, letting it ſtand twelve hours between the three firſt and the three laſt varniſhes. 3. Your work being thus far done, take the following japan-varniſh: of the fineſt ſeed-lac varniſh, ſix ounces; of lamp-black, a ſufficient quantity; mix them, and with that let your work be waſhed twelve times, ſtanding twelve hours betwixt the firſt ſix and the laſt ſix waſhing. 4. Then letting it ſtand to dry for ſix or ſeven days, poliſh it with tripoli and a rag, as before directed: but in poliſhing you muſt work at it only till it is almoſt ſmooth, and then let it ſtand by for two days: afterwards poliſh it again, almoſt enough; then let it ſtand for ſix days, after which finiſh the poliſhing of it; finally, clear it up with oil and lamp-black, by which means you will have a good black japan ſcarce at all inferior to the true japan.

For a white japan. 1. Lay the ground with iſing-glaſs ſize mixed with as much whiting ſcraped into it as will make it of a proper thickneſs; with this whiten your work once over, and being thoroughly dry, do it over again; and in like manner repeat it the third time; after which let it ſtand for twelve hours; covering it from duſt; ruſh it with dutch ruſhing as near the grain of the wood as is proper. 2. Then taking firſt iſing-glaſs ſize, and flake white, ſo much as will make the ſize of a fair body, mix them well together, and with this go over your work three ſeveral times, letting it dry between each time, and ruſh it as before. 3. Then take white ſtarch boiled in fair water, till it is ſomewhat thick, waſh over the whole work twice with it, blood-warm; letting it dry as before. 4. Letting it ſtand for a day or two, it being firſt waſhed with rectified ſpirit of wine, to clear it from the duſt, dip a pure clean pencil into the fineſt white varniſh, and do over the work ſix or ſeven times; and if this be well done, it will give a finer gloſs than if it were poliſhed: if it be not well done, poliſhing will be neceſſary, for which reaſon you muſt give it five or ſix varniſhes more. In poliſhing you muſt make uſe of the fineſt tripoli; and inſtead of lamp-black and oil, muſt uſe putty and oil, and conclude with white ſtarch mixed with oil.

Common red japan. 1. Take iſing-glaſs ſize, fine vermilion, a ſufficient quantity, as much as is proper; with the former mixture do your work over four times; firſt warming it by the fire, letting it dry each time, and ruſhing it as before. 2. This being done, waſh it over eight times

times with ordinary feed lac varnifh, and fet it by for twelve hours: then rufh it again, but flightly, to make it look fmooth. 3. And, laftly, for an exquifite outward covering, wafh it ten times with the beft lac-feed varnifh; let it lie feven days to dry, and then polifh it with tripoli, and clear it up with oil and lamp-black.

A deeper red japan may be made by mixing fine fanguis draconis, in powder, with the varnifh; and a pale red japan may be had by mixing fo much white lead with it, as to make it of whatever degree of palenefs you pleafe.

Blue japan. 1. Take gum-water what quantity you pleafe, and a fufficient quantity of white lead; grind them well upon a marble; take ifing-glafs fize what quantity you pleafe, and of the fineft and beft fmalt, a fufficient quantity; mix them well together; then add to them of the white lead, ground as before, fo much as will give it a fufficient body; mix all together to the confiftence of a paint. 2. Do you work over with this mixture three or four times, till you perceive the blue to lie with a good and fair body, letting it dry thoroughly between each time: if your blue is too pale, put more fmalt among your fize, without any white lead, and fo *vice verfa*. 3. Then rufh it fmooth, and go over it again with a ftronger blue; and when it is dry, wafh it three times with the cleareft ifing-glafs fize alone, and let it ftand for two days to dry, covering it. 4. Warm your work gently at the fire, and with a pencil varnifh it over with the fineft white varnifh, repeating it feven or eight times, letting it ftand to dry two days as before. After which repeat again the wafhes feven or eight times in like manner. 5. Let it now ftand for a week, and then polifh it as before, and clear it up with lamp-black and oil.

Chefnut-coloured japan. Take indian red, grind it with ifing-glafs fize upon a porphyry-ftone, till they are as foft and as fine as butter: then mix a little white lead, which grind ftrongly; and, laftly, lamp-black, in due proportion.

A tortoife-fhell japan. Firft lay a white ground as before directed; then with proper colours, as vermilion, auripigment, &c. duly mixed with turpentine-varnifh, ftreak and cloud or fhadow the white ground with any irregular fancy at pleafure, in imitation of tortoife-fhell: then let it ftand to dry, and ftriking it here and there with reddifh-yellow varnifh, mixed with a little cinnabar, cloud the work up and down, touching it up alfo with varnifh mixed with lamp or ivory-black. Having done this, varnifh it five or fix times over with the fineft white varnifh, letting it dry between every wafhing.

Japanning with gold fize. The fize being laid over that part only which you intend to gild, as already directed, let it remain there till it is fo dry, that when you put your finger on it, it be glutinous and clammy, but not fo moift that the particles fhould come off with your fingers. It is in this temper that the gold is to be applied: then take a piece of wafhing-leather, or the like, and wrapping it round your fore-finger, dip it in the gold-duft, and rub it where your gold-fize is laid; for it will ftick no where but on the fize, and if any gold-duft lies about your work, brufh it away with a fine clean varnifhing-brufh. Then, with your pencil, draw that part with gold-fize alfo which is defigned for your copper, and letting it dry as in the former cafe, cover it over with copper-duft in the fame manner. Having done this, lay your filver-fize, and when it is dry, as before, lay on your filver-duft, as in the two former. But it is to be obferved, that the metalline colours are to be laid fucceffively one after another, letting each be covered and thoroughly dry before you enter upon a diftinct colour. After all thefe, the other colours which are not metalline are to be laid on with gum-water, referving the rock, &c. for the laft part of the work. Let your fize be of a due confiftence, neither too thick nor too thin, that it may run fmooth and clean. See the article SIZE.

Japanning metals with gum-water. Take gum-water, put it into a mufcle-fhell, with which mix fo much of your metal or colour as may give it a proper confiftence, fo that it may run fine and fmooth; having prepared and well mixed your metals and colours, lay on your defign; your gum-water, being thoroughly dried, you are to run it over with fine feed-lac varnifh, and afterwards polifh it and clear it.

Laying fpeckles or ftrewings on japan work. To do this, either on outfide or infide boxes, drawers, &c. mix your fpeckles with ordinary lac-varnifh, fo much as may make it fit to work, but not fo thick as for colour, and mix them well

well with a proper brush. Warm the work to be done gently by the fire, and with a pencil wash it over with the former mixture, and when it is dry repeat it again, and so often till your speckles lie as thick and even as you desire. When it is thoroughly dry, go over and beautify the work three or four times with seed-lac varnish mixt with turpentine, and so let it dry, and the work is finished, except you have a mind to polish it. But if you polish it, you must wash it eight or ten times over with the best seed-lac varnish, letting it stand to dry every time, and afterwards polish it, as before directed. All sorts of coloured speckles may be thus used, except those of silver, the laying on of which requires the best and finest of the lack-varnish, or the best white varnish, which must make it fit for polishing; but if you have not a mind to polish it, fewer washes of the varnish will be sufficient.

Japanned and laquered ware of the East Indies, pay duty for every 100 l. gross value at the sale 38 l. on importation, and the drawback is 35 l. 12 s. 6 d. on exportation.

JASIONE, in botany, a genus of the syngenesia-polygamia monogamia class of plants; the partial corolla whereof consists of five lanceolated erect petals, connected at the base; the fruit is a roundish capsule, bilocular, and coronated with a proper calyx; the seeds are small.

JASMINE, jasminum, in botany, a genus of the diandria-monogynia class of plants, the flower of which is monopetalous, with a long cylindraceous tube, and a plain limb, divided into five segments: the fruit is a smooth, oval, and bilocular berry, containing two large oblong seeds, covered with a membrane, and convex on one side and concave on the other. See plate CXLII. fig. 3.

According to Dale, the flowers of white jasmine are emollient, aperient, and heating; and with these intentions prescribed in difficult breathing, the cough, pleurisy, pain of the intestines, *&c.*

Fennel-leaved JASMINE, a species of ipomæa. See the article IPOMÆA.

Ilex-leaved JASMINE, a plant otherwise called lantana. See LANTANA.

Indian JASMINE, a distinct genus of plants called by Linnæus nyctanthes.

Red JASMINE, plumeria, in botany. See the article PLUMERIA.

Scarlet-JASMINE, the same with bignonia, or trumpet-flower. See BIGNONIA.

JASPACHATES, a name given by the antients to a species of agate, from its being truly a composition of agate and the genuine matter of jasper.

JASPER, in natural-history, a genus of scrupi, of a complex irregular structure, of great variety of colours, and emulating the appearance of the finer marbles, or semipellucid gems.

The great characteristic of jaspers is, that they all readily strike fire with steel, and make not the least effervescence with aquafortis.

Jaspers, tho' commonly reckoned among the precious stones, ought undoubtedly to be ranged among the scrupi; being only opake crystalline masses, variously debased with an earthy admixture: and to this last ingredient it is that they owe all their variety of colours, as white, green, red, brown, and bluish.

The several kinds of nephritic stone, and the lapis divinus or jade, are all genuine jaspers; but the hard, bright, green jasper of the East Indies, seems to be the true medicinal kind. It is found in masses of various sizes and shapes, but the more usual standard as to size, is between four and six inches in diameter; but there are masses of it found of a foot or more in diameter, and others no larger than a horse-bean. It is generally simple and unmixed; but if it be variegated at all, it is always with white, and this is disposed not in streaks or veins, but in clouds. It is capable of a very fine polish, and when the white clouds are well disposed, is very beautiful, and in pieces not too thick, is tolerably pellucid, when held up against the light.

It is recommended as an astringent, and ordered to be taken in powder against hæmorrhages of all kinds. The antients wore it as an amulet to prevent abortion, and tied it, on this occasion, to the belly of the person; and they were of opinion that it was able to stop hæmorrhages by being only worn on the arm. At present we give no credit to any thing of this marvellous kind, and consequently the virtues of this, as well as of the other semi-pellucid gems, is greatly out of repute.

JASPI-CAMEA, in natural history, the dull, broad-zoned, green and white camea; being a very elegant species much resembling the common camæa in all things but colour. See CAMÆA.

JASPONYX, in natural history, the purest horn-coloured onyx, with beautiful green

zones,

ſtones, which are compoſed of the genuine matter of the fineſt jaſpers. See the articles JASPER and ONYX.

JASQUES, a port-town of Perſia, ſituated on the gulph of Ormus: eaſt long. 58°, north lat. 25°.

JATRALIPTA, or JATRALIPTES, in grecian antiquity, an officer of the gymnaſium, whoſe employment it was to anoint the athletæ.

JATRALIPTES is alſo an appellation given to phyſicians, who pretend to cure all diſeaſes by external unctions.

JATROPHA, the CASSADA-PLANT, in botany, a genus of the monoecia-polyandria claſs of plants, the male flower of which is monopetalous, and of a faucer or funnel-like ſhape, with a very ſhort tube, and the limb divided into five ſegments: the ſtamina are ten ſubulated filaments, alternately ſhorter: the female flower is roſaceous, conſiſting of five petals; and the fruit is a roundiſh, trilocular capſule, with a roundiſh ſeed in each cell. See the article CASSAVI.

JAVA, an iſland of the Eaſt Indies, ſituated between 102° and 113° of eaſt longitude, and between 5° and 8° of ſouth latitude; being about 700 miles long from eaſt to weſt, and one hundred broad.

JAVA *the leſs*, or BALLY, a ſmall iſland on the eaſt of Java Major, and ſeparated from it by a narrow channel.

JAVELIN, *haſta*, in antiquity, a ſort of ſpear, five feet and an half long; the ſhaft of which was of wood, with a ſteel point.

Every ſoldier, in the roman armies, had ſeven of theſe; which were very light and ſlender.

JAUNDICE, in medicine, a diſeaſe which is principally diſcovered by the yellow tincture of the ſkin, but moſt diſtinctly in the coats of the eyes, where it gives the firſt notice of its invaſion.

The ſymptoms, according to Sydenham, are heavineſs, inactivity, laſſitude of the whole body, anxiety, uneaſineſs about the hypochondria, ſickneſs at the ſtomach, oppreſſion in the breaſt, difficult reſpiration, a dry and harſh ſkin, coſtiveneſs, hard white excrements, yellow high-coloured urine, which will tincture linen or paper with a ſaffron hue: there is a bitter taſte in the mouth, and all objects ſeem to be diſcoloured.

The immediate cauſe of a jaundice, ſays Towne, is an obſtructed excretion of the bile from the veſica fellis and liver into the duodenum, which being forced back upon the liver, mixes with the blood, by which it is carried into the whole body, whence the ſkin and urine will be tinctured with the colour of the bile. See the articles BILE and LIVER.

This obſtruction may be occaſioned by any thing in the duct that plugs up the paſſage, or by external preſſure which cloſes its mouth; or by ſpaſms contracting the fibres thereof. Hence we may ſee why the jaundice ſucceeds the flatulent colic, why pregnant women are ſubject to it, and why ſpaſms of hypochondrical and hyſterical perſons produce the ſame effect. Sudden frights, the generation of two great plenty of bile, ſchirrous tumours, or ulcers of the liver, obſtructions of the menſes, obſtinate intermitting fevers, and the bites of venomous animals, will alſo produce this diſeaſe.

Hoffman thinks emetics highly proper in the cure of a jaundice, if the diſeaſe does not proceed from violent anger, ſpaſms of the ſtomach, a cardialgia, a ſpaſmodic colic, or a ſtone lodged in the cyſtic duct, exciting a violent uneaſineſs about the precordia; and that when a bilious ſordes lodging in the duodenum, and cloſing up the orifice of the ductus choledochus intercepts the paſſage of the bile, or when a tenacious, moveable, and not highly concreted bilious matter plugs up the hepatic ducts, emetics are of ſingular efficacy in evacuating it. A ſcruple of ipecacuanha, with a grain of tartar emetic, will be a proper doſe; or two grains of tartar emetic in a draught of generous wine, or in an infuſion of manna, drinking water-gruel after it.

In this caſe, Huxham, after emetics, thinks cathartics will be proper, compounded of aloetics and mercurials. Then ſaponaceous attenuants, preparations of tartar, and volatiles, and laſt of all chalybeats; but the laſt are not to be given till the humours are ſufficiently attenuated, otherwiſe an incurable ſchirrus of the liver may enſue. He alſo recommends the terra foliata, otherwiſe called tartarum regeneratum, and, by the college, ſal diureticus, as the greateſt diſſolvent and the moſt powerful remedy in this diſeaſe. Its doſe is from five grains to a ſcruple, and upwards.

Saponaceous medicines are often given with the ſame intention in this diſeaſe with ſucceſs, thus: take caſtile ſoap, three ounces; powder of the rhapontic plant, and ſpecies of hiera picra, of each half

half an ounce; as much of the syrup of orange peel as is sufficient to make an electuary, of which the patient is to take from half a dram to a whole dram twice a day. After some time, with the above precaution, may be added half an ounce of steel-filings: or take gum ammoniac, two drams; powder of squills, one dram; castile soap, three drams; and a sufficient quantity of white sugar: make ten pills out of every dram, three of which are to be taken every morning, and as many at night going to bed.

These are attenuants which should be preceded with gentle purgatives; for Hoffman affirms, that all drastic purgatives are prejudicial, as they encrease spasms, throw the blood into violent commotions, and impair the strength: therefore, besides these which Huxham has directed above, the following formula may be sometimes proper. Take of good rhapontic powder, half a dram; cream of tartar, one dram; simple cinnamon-water, three ounces, and syrup of roses, two drams, for a draught. When a jaundice succeeds the colic, Sydenham is of opinion that all purgatives are to be omitted, rhubarb only excepted; and this is not to be prescribed without evident reason: but if the jaundice comes on without any preceding colic, then the purgatives already mentioned may be given; and if the disease does not yield to this method, the doctor is of opinion that chalybeat waters will be proper.

In a stubborn jaundice, Allen recommends æthiops mineral.

When a jaundice is attended with a hæmorrhage, it is always dangerous in the opinion of Huxham, because it denotes a most acrimonious and dissolved state of the blood; in which case he thinks attenuants, aloetics, volatiles, and chalybeats, little better than poison; whereas acids, diluents, demulcents, and mineral waters, are very beneficial. Hemp-seed boiled in milk till it breaks, is often advantageous: the dose is five ounces twice a day. Or an emulsion of white poppy-seeds and sweet almonds after moderate bleeding, if the patient is feverish, and the pulse will allow it, and gentle purging.

Sylvius observes that many children are afflicted with this distemper soon after they are born, and that some are often born with it. It is his opinion, that this disease may often arise, without any obstruction of the biliary duct.

The remedies, which cure the jaundice, are not so safely given to children as to adults; however, the following powder, given in the nurse's milk twice or three times a day, seldom fails of curing this disease in children. Take english saffron and bezoar mineral, of each one grain; and being beat to powder, let them be mixed. When the body is bound, the best purgative is rhubarb, and particularly the syrup of succory with rhubarb.

JAW, *maxilla*, in anatomy. See the article MAXILLA.

In fractures of the lower jaw, after the patient is commodiously seated against the light, and his head held firm by an assistant, the surgeon is to introduce the thumb or fore-finger of one hand into his mouth, applying his other hand externally; and by this means, to press the fragments of the jaw on each side, till they have regained their former situation, which may be known by the regular disposition of the teeth. When properly reduced, they must be covered internally first with a plaster, and then a compress dipt in spirit of wine; and another compress, sewed to a piece of pasteboard in the form of a half jaw, is to be laid on externally. These are to be kept on by the bandage with four heads, perforated in the middle to let in the chin. But whenever the jaw is found to be fractured on both sides, it is usual to apply internally, after the compress dipt in spirit of wine, another made of thin paste-board, perforated in the middle, and accommodated to the figure of the chin. The patient should live upon broths and soops, and avoid all talking, till the jaw is grown firm; and at the same time take care not to lie flat either on the back or face.

The lower jaw is indeed seldom luxated, because held very firm by strong ligaments and muscles; but when this happens, whether from a blow, or by opening the mouth too wide in yawning, the chin is distorted on the opposite side, and the mouth gapes open; and when luxated on both sides, then the mouth not only gapes open, but the chin also hangs down. When the luxation is only on one side, the cure is usually not so very difficult; but when both heads are dislocated, and not properly restored to their places, it always occasions the worst of symptoms,

ſymptoms, as violent pains, inflammations, convulſions, fevers, vomitings, and at length death. But if an expert ſurgeon comes in time, the luxation is not very difficult to reduce.

When this happens, the patient is to be directly ſeated on a low ſtool, ſo that an aſſiſtant may hold his head firmly back againſt his breaſt; then the ſurgeon is to thruſt his two thumbs as far back into the patient's mouth as he well can; but they are to be firſt wrapped round in a handkerchief, to prevent them from ſlipping or being hurt; and his other fingers are to be applied to the jaw externally: when he has got firm hold of the jaw, it is to be ſtrongly preſſed, firſt downwards, then backwards, and laſtly upwards, but ſo as that all may be done in an inſtant, by which means the elapſed heads of the jaw may be eaſily ſhoved into their former cavities: but the ſurgeon ought to be always careful to ſnatch his thumbs quickly out of the patient's mouth, leſt they ſhould be compreſſed, bruiſed or bit, by reducing the jaw into its place.

If the jaw be out on one ſide only, every thing is to be done in the ſame manner; only obſerving that the luxated ſide is to be forced more ſtrongly downwards and backwards than the ſound one. As for bandages, there ſeems no great occaſion for them in this caſe, unleſs the luxation has remained ſome time before it was reduced; for then it may not be improper to apply, for ſeveral days, the four-headed bandage, with ſome ſtrengthening ſpirit, which may be taken off when the patient intends to eat.

JAWER, a city of Sileſia, capital of the dutchy of Jawer, ſituated in 16° 12′ eaſt long. and 51° 8′ north lat.

JAY, in ornithology, the variegated corvus, with the covering feathers of the wings blue, variegated with black and white. See the article CORVUS.

JAZY, a city of european Turky, capital of Moldavia, ſituated on the river Pruth, in eaſt long. 28° 40′, north lat. 47° 15′.

IBERIA, the antient name of Spain, as well as of Georgia in Aſia.

IBERIS, SCIATICA-CRESS, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, the corolla whereof conſiſts of four unequal petals; vertically oval, obtuſe, and patent; the fruit is a little pod erect, roundiſh, compreſſed, ſurrounded by an acute bifid margin on the upper ſide, and containing two cells: the ſeed, in each cell, is ſingle and roundiſh.

IBEX, in zoology, an animal of the goat-kind, with extremely long nodoſe horns, which bend backwards, and are of a blackiſh colour, and annulated on the ſurface. The body is of a dark duſky colour, and is leſs in proportion to the height than that of the common goat: it has a great reſemblance to the deer-kind; the legs are alſo perfectly like thoſe of the deer, ſtraight, elegant, and ſlender. It is frequent in many parts of Europe, and, notwithſtanding its vaſt horns, runs and leaps with ſurpriſing force and agility. See plate CXLII. fig. 4.

IBIS, a bird which was very uſeful to the Egyptians for deſtroying ſerpents, locuſts, and caterpillars; and, on that account, had divine honours paid it.

It is all over black, and about the ſize of the curlew, with the head of a cormorant, and the long neck of a heron.

IBURG, a town of Weſtphalia, in Germany, twelve miles ſouth of Oſnaburg.

ICE, *glacies*, in phyſiology, a ſolid tranſparent, and brittle body, formed of ſome fluid, particularly water, by means of cold. See FROST and FREEZING.

The younger Lemery obſerves, that ice is only a re-eſtabliſhment of the parts of water in their natural ſtate; that the mere abſence of fire is ſufficient to account for this re-eſtabliſhment; and that the fluidity of water is a real fuſion, like that of metals expoſed to the fire; differing only in this, that a greater quantity of fire is neceſſary to the one than the other. Gallileo was the firſt that obſerved ice to be lighter than the water which compoſed it: and hence it happens, that ice floats upon water, its ſpecific gravity being to that of water as eight to nine. This rarefaction of ice is owing to the air bubbles produced in the water by freezing; and being conſiderably larger in proportion to the water frozen, render the body ſo much ſpecifically lighter: and theſe air-bubbles growing large, acquire a great expanſive power, ſo as to burſt the containing veſſels, though ever ſo ſtrong. It has been imagined, that this burſting of the veſſels by frozen water, was owing to the contraction of the ſolid parts of the veſſel upon the ice, and not to the internal expanſion: but the florentine academicians ſhewed the contrary by the following experiment: they filled a hollow globe of pure gold with cold water, then, ſoldering up the orifice, expoſed it to a freezing air; having firſt fitted to it a metallic ring, ſomewhat leſs than a great circle

of the fphere, and carefully marked the part of the fphere where the edge of the ring touched it. While the water froze in the globe, they obferved the external furface to be fo much enlarged, that the metallic ring remarkably afcended towards the vertex from the greateft horizontal circle: whence the globe expanded much more than the ring contracted by the cold; as was plain from comparing this ring with another, originally made of the fame fize.

But fnow-water, or any water long boiled at the fire, freezes flower, and affords a more folid ice, with fewer bubbles, than other water not fo treated. And pure water long kept in vacuo, and froze afterwards there, freezes much fooner with the fame degree of cold, than water unpurged of air, and expofed to the atmofphere; whilft ice is thus made of water from which the air was extracted, is much harder, more ponderous, equable, and tranfparent than common ice. Whence it is certain, that the air naturally contained in water, being brought together by the freezing cold, occafions its greater rarefaction and levity: and in this manner ice has been procured, that would not float upon water. If finely powdered fea-falt, fal gem, or fal ammoniac be put to powdered ice or fnow, in a freezing feafon, and they be well mixed together, the falts will immediately begin to diffolve, and the coldnefs grow much more intenfe; and this, fo far as we yet know, to a certain degree, whatever were the degrees of cold in the bodies before their mixture. Alcohol alfo being thus mixed with ice, increafes its coldnefs: the pure, faline, and acid fpirits of fea-fal, nitre, aqua fortis, and aqua regia, the ftronger they are, the more intenfe cold they produce when mixed with ice.

Hence, to make the moft perfect ice, we fhould take the pureft water, and perfectly purge it of air by the air-pump, and then freeze it in the fevereft froft: thus we fhall obtain ice of the greateft hardnefs, denfity, purity, tranfparency, and gravity; the true phyfical characters of ice to the fenfes: tho' even this ice, fo far as we now know, would immediately melt into water with a heat of thirty degrees. Whence it follows, that the moft natural cold cannot convert pure water into ftone, cryftal, or gems; for this artificial cold is above forty degrees ftronger than that, where water is faid to be frozen into rock-cryftal: for by all the experiments that have been made, no increafe of cold has made ice at all more difficult to melt than common ice.

ICE-HOUSE, a building contrived to preferve ice for the ufe of a family in the fummer-feafon.

Ice-houfes are more generally ufed in warm countries, than with us, particularly in Italy, where the meaneft perfon who rents a houfe, has his vault or cellar for ice. However, as ice is much more ufed in England than it was formerly, it may not be amifs to give fome directions for the choice of their fituation, for the manner of building them, and for the management of the ice.

As to the fituation, it ought to be placed upon a dry fpot of ground; becaufe wherever there is moifture, the ice will melt: therefore in all ftrong lands which retain the wet, too much pains cannot be taken to make drains all round them. The place fhould alfo be elevated, and as much expofed to the fun and air as poffible.

As to the figure of the building, that may be according to the fancy of the owner; but a circular form is moft proper for the well in which the ice is to be preferved; which fhould be of a fize and depth proportionable to the quantity to be kept; for it is proper to have it large enough to contain ice for two years confumption, fo that if a mild winter fhould happen, in which little or no ice is to be had, there may be a ftock to fupply the want. At the bottom of the well there fhould be a fpace of about two feet deep left to receive any moifture that may drain from the ice; over this fpace fhould be placed a ftrong wooden grate, and from thence a fmall drain fhould be laid under ground, to carry off the wet. The fides of the well fhould be built with brick, at leaft two bricks thick; for the thicker it is, the lefs danger there will be of the well being affected by any external caufe. When the well is brought up within three feet of the furface, there fhould be another outer-arch or wall begun, which fhould be carried up to the height of the top of the intended arch of the well; and if there be a fecond arch turned over this wall, it will add to the goodnefs of the houfe: the roof muft be high enough above the inner arch to admit of a doorway to get out the ice. If the building is to be covered with flates or tiles, reeds fhould be laid confiderably thick under them, to keep out the fun and external

 air;

air; and if thefe reeds are laid the thicknefs of fix or eight inches, and plaiftered over with lime and hair, there will be no danger of the heat getting thro' them. The external wall may be built in what form the proprietor pleafes; and as thefe ice-houfes are placed in gardens, they are fometimes fo contrived as to have an handfome alcove-feat in front, with a fmall door behind it, through which a perfon might enter to take out the ice; and a large door on the other fide, fronting the north, with a porch wide enough for a fmall cart to back in, in order to fhoot down the ice near the mouth of the well, which need not be more than two feet diameter, and a ftone fo contrived as to fhut it up in the exacteft manner: all the vacant fpace above and between this and the large door fhould be filled up with barley-ftraw. The building thus finifhed, fhould have time to dry before the ice is put into it.

It is to be obferved that upon the wooden grate, at the bottom of the well, there fhould be laid fome fmall faggots, and if upon thefe a layer of reeds is placed fmooth for the ice to lie upon, it will be better than ftraw, which is commonly ufed. As to the choice of the ice, the thinner it is, the eafier it may be broken to powder; for the fmaller it is broken, the better it will unite when put into the well. In putting it in, care muft be taken to ram it as clofe as poffible; and alfo to allow a vacancy of about two inches, all round, next the fide of the well, to give paffage to any moifture occafioned by the melting of fome of the ice. When the ice is put into the well, if a little falt-petre be mixed with it at every ten inches or a foot in thicknefs, it will caufe it to unite more clofely into a folid mafs.

ICH DIEN, the motto of the prince of Wales's arms, fignifying, in the high dutch, *I ferve*.

It was firft ufed by Edward the black prince, to fhew his fubjection to his father king Edward III.

ICHNEUMON, in zoology, the name of the bluifh meles, with uniform claws. See the article MELES.

This animal is truly of the badger-kind, and indeed very much refembles the common badger in almoft every particular. It is about the fize of a large cat; the head is of a blue colour, approaching to black, efpecially about the nofe; and all the reft of the body is of a grey colour, like that of our common badger, the under part being darker than the back or fides.

ICHNEUMON is alfo the name of a genus of flies, of the hymenoptera order, with a triple fting at the anus.

ICHNOGRAPHY, in perfpective, the view of any thing cut off by a plane parallel to the horizon, juft at the bafe of it.

Among painters it fignifies a defcription of images, or of antient ftatues of marble and copper, of bufts and femi-bufts, of paintings in frefco, mofaic works, and antient pieces of miniature.

ICHNOGRAPHY, in architecture, a defcription or draught of the platform or groundwork of a houfe, or other building. Or it is the geometrical plan or platform of an edifice or houfe, or the ground-work of an houfe or building, delineated upon paper, defcribing the form of the feveral apartments, rooms, windows, chimnies, &c. See the article BUILDING.

The drawing or defigning of this is properly the bufinefs of the mafter architect, or furveyor; it being, indeed, the moft difficult of any.

ICHNOGRAPHY, in fortification, denotes the plan or reprefentation of the length and breadth of a fortrefs, the diftinct parts of which are marked out, either on the ground itfelf, or on paper.

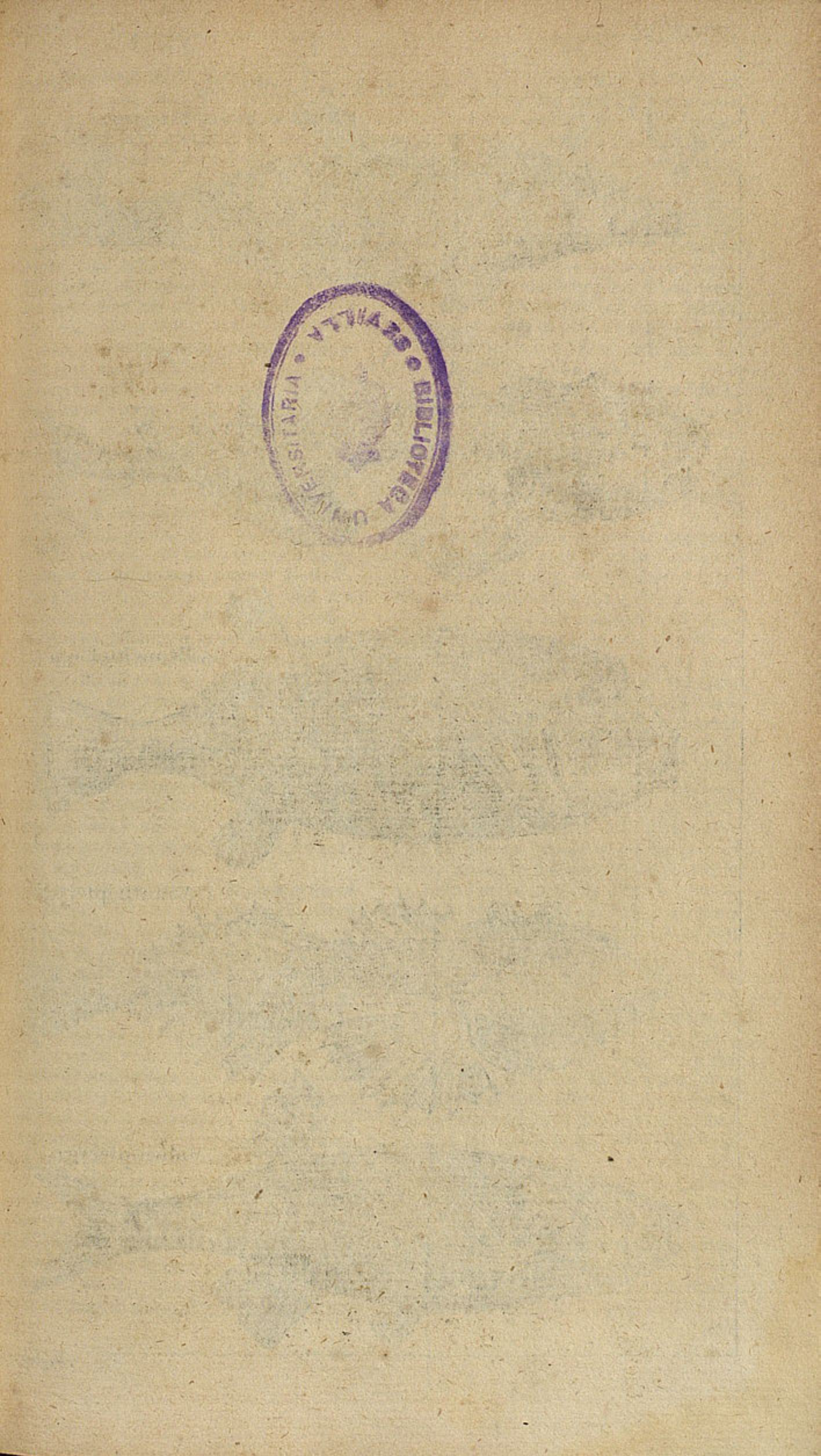
ICHOGLANS, the grand fignior's pages, ferving in the feraglio.

Thofe are the children of chriftian parents, either taken in war, purchafed, or prefents from the viceroys and governors of diftant provinces: they are the moft fprightly, beautiful, and well made that can be met with; and are always reviewed and approved of by the grand fignior himfelf, before they are admitted into the feraglios of Pera, Conftantinople, or Adrianople, being the three colleges where they are educated, or fitted for employments, according to the opinion the court entertains of them.

ICHOR, properly fignifies a thin watry humour, like ferum: but is fometimes alfo ufed for a thicker kind, flowing from ulcers, called alfo fanies.

ICHTHYOCOLLA, ISINGLASS, in the materia medica, &c. a preparation from the fifh known by the name of hufo. See the article HUSO.

This is a tough and firm fubftance, of a whitifh colour, and in fome degree tranfparent; it is light, moderately hard, very flexile, and of fcarce any fmell, and very little tafte. We ufually receive it in twifted pieces of an oblong and rounded figure,


BIBLIOTECA UNIVERSITARIA
SEVILLA

ICHTHYOLOGY.

Order 1. Plagiuri

2. Chondropterygii

3. Branchiostegi

4. Acanthopterygii

5. Malacopterygii

T. Jefferys sculp.

figure, and bent in the fhape of a horfe-fhoe: this our druggifts ufually beat and pull to pieces, and fell it in thin fhreds like fkins, which eafily diffolve: befides this kind of round ifinglafs, we meet with fome in fmall thin fquare cakes, white and very tranfparent; thefe are the fineft of all. But ifinglafs, of whatever fhape, is to be chofen clean, whitifh, and pellucid.

The method of preparing the ichthyocolla is this: they cut off all the fins of the hufo, clofe to the flefh, and take out the bladder, ftomach, and inteftines; they wafh thefe very clean, and then cut them in pieces, and throwing them into a large quantity of water, they let them fteep four and twenty hours, and after this they kindle a fire under the veffel, and keep the liquor juft boiling till the greater part of the matters are diffolved; they then ftir the whole brifkly about; then ftrain it through flannels, and fet the liquor by to cool. When there is a large quantity of fat ufually formed upon it, which is carefully fkimmed off, and the clear liquor is poured off from the groffer parts which fubfide, it is put over the fire again, and gently evaporated and fkimmed afrefh, all the time, till by trials they find, that, on letting a fpoonful of it cool, it will harden into the confiftence of glue. Great care is taken to keep the fire very gentle, to prevent burning towards the end of this evaporation. They then pour it out upon a large, fmooth, wooden table; and as it cools, form it into the maffes we meet with it in, by cutting and rolling it up.

The greateft quantity of ifinglafs is made in Ruffia. We have it principally from Holland, the Dutch contracting for the moft of it, before it is made.

It is an excellent agglutinant and ftrengthener, and is often prefcribed in jellies and broth, but rarely enters any compofitions of the regular medicinal form. It is the moft efficacious as well as the moft fafe and innocent of all the ingredients ufed for cleaning wines, upon which account the wine-coopers ufe a much greater quantity of it than the apothecaries.

A very valuable glue is alfo made of this drug, which is a proper form to keep it for the wine-coopers ufe.

ICHTHYOLOGY, ιχθυολογια, the fcience of fifhes, or that branch of zoology which treats of fifhes. See the article Fish.

Artedi defines ichthyology to be the fcience or art of diftinguifhing all the parts of fifhes, and calling them by their proper names; alfo of giving every fifh its generical and fpecific name; and laftly, to commemorate fome of its remarkable qualities. See plate CXLIII.

We have already, under the article Fish, given the general diftribution of fifhes into the claffes of plagiuri, chondropterygious, branchioftegious, acanthopterygious, and malacopterygious fifhes, with the peculiar characters of each clafs; and in the annexed plate of Ichthyology, there is delineated a fifh of each clafs, in the order above mentioned.

As to the plagiuri, or cetaceous fifhes, they agree in many particulars with hairy quadrupeds, and are diftinguifhed into genera by much the fame characters, efpecially the teeth; but befides thefe, the number of fins is alfo of ufe in arranging them into diftinct genera.

The chondropterygious or cartilaginous fifhes differ from each other in the figure of their whole body, the number of foramina or apertures of the gills, &c. by which they are moft commodioufly fubdivided into genera; fince the characters of the firft clafs are here fo various as to differ in the different fpecies of the fame genus. The characters by which thefe two claffes of fifhes may be fubdivided into diftinct genera, are fimple and obvious: but it is a matter of greater difficulty to fix upon invariable characters, by which the other claffes may be fubdivided in the fame manner. The multitude of genera contained under each of them, added to the great refemblance to be found between really diftinct genera, make it no eafy tafk to diftinguifh thefe genera from each other, which is beft done by eftablifhing the generical characters upon fuch external parts as are moft conftant and uniform in the fame genus, and leaft common to other genera. From many inftances produced by Artedi, it appears, 1. That the figure of the fins and tail is of no ufe in determining the genera of thefe fifhes. 2. That the figure of the back, breaft, and belly, and even of the whole body, with refpect to length and breadth, is of no fervice for eftablifhing generical diftinctions. 3. That the figure of the head, mouth, eyes, noftrils, and other parts belonging to the head, is indeed of the utmoft confequence in diftinguifhing the different genera; but as this figure is common to feveral otherwife diftinct genera, it is rather ferviceable

able in eftablifhing the orders, than genera of fifhes. 4. The fame may be obferved of the figure of the fcales, and the fituation of the feveral external parts of fifhes, as the mouth, noftrils, eyes, fins, *&c.* thefe, though of great ufe in the defcription of fifhes, afford no diftinctive characters of the genera, as being common to feveral. 5. Neither is the number of fins or teeth to be reckoned a generical character; fince this varies in fifhes undoubtedly of the fame genus.

Having thus fhewn what properties of fifhes are not, he next confiders thofe which are fufficient generical characters; and obferves, that of all the external parts, the only ones to be found in all the fpinofe fifhes, and yet different in each genus, are the little bones of the membrana branchioftega, or membrane of the gills. Thefe bones are found in almoft all fifhes that have bones, though more confpicuous in fome than in others, by reafon of the different thicknefs of the membrane; and the number of them is more conftant in the fame genus, than that of the fins: thus, all the gadi have conftantly feven of thefe little bones in the branchioftege membrane of each fide; all the fpecies of pearch have likewife feven; the cyprini, three; the cotti, fix; the clupeæ, eight; the efoces, fourteen; and fo of others. There are only two known genera of fpinofe fifh, wherein the number of thefe bones is not the fame in all the fpecies of the fame genus, *viz.* the falmon and coregonus; thefe bones in different fpecies of falmons being ten, eleven, and twelve; and in the different fpecies of coregonus, feven, eight, nine, and ten: and it is very remarkable, that this difference only takes place in fifhes, the fpecies of which are fo very like each other, as to be known to belong to the fame genus at firft fight.

Hence it follows, that the number of thefe little bones in the branchioftege membrane affords the firft and moft effential character for diftinguifhing the genera of catheturous and offeopterygious fifhes. This however is not fufficient alone; it being alfo neceffary, befides the fame number of thefe bones in the membrane of the gills, 1. That the fifhes belonging to each genus, fhould have the fame external figure. 2. That the fituation, no lefs than the number of their fins, be the fame. 3. The teeth fhould alfo have the fame fituation. 4. The difpofition of the fcales fhould alfo be the fame. 5. The figure and difpofition of the other external and internal parts, particularly of the ftomach and its appendices, the inteftines, air-bladder, *&c.* fhould alfo agree.

If thefe characters are found to correfpond, there can be no doubt but the genus founded on them is juft and natural. However, it muft be obferved, that thefe characters are not to be expected in full perfection in all the fifhes belonging to one and the fame genus. But three of thefe, *viz.* the fame number of bones in the branchioftege membrane, the fame external figure, and the fame difpofition of the fins, are effential to the famenefs of the genus; the other characters being only additional to thefe.

ICHTHYOLOGIST, an author who has written profeffedly of fifhes.

Ichthyologifts are very numerous; but thofe who have treated this fubject with moft accuracy and judgment, are Ariftotle, Bellonius, Rondeletius, Salvian, Gefner, Willughby, Ray, and Artedi; efpecially this laft author, who is univerfally acknowledged to be the beft on this fubject; and next to him come Willughby and Ray.

ICHTHYPERIA, in natural hiftory, a name given by Dr. Hill to the bony palates and mouths of fifhes, ufually met with either foffile, in fingle pieces, or in fragments. They are of the fame fubftance with the bufonitæ, and are of very various figures, fome broad and fhort, others longer and flender; fome very gibbofe, and others plainly arched. They are likewife of various fizes, from the tenth of an inch to two inches in length, and an inch in breadth. See BUFONITÆ.

ICHTHYS, ιχθυς, in antiquity, a celebrated acroftic of the erythræan fibyl, the firft words of each verfe of which were, Ιησȣ Χριςος Θεȣ υἱος σωτηρ, that is, *Jefus Chriftus Dei filius fervator*; and the initial greek letters form the word ιχθυς, whence the name.

ICKWORTH, a town of Suffolk, fix miles eaft of St. Edmundfbury.

ICONIUM, the fame with Cogni. See the article COGNI.

ICONOCLASTS, εικονοκλαςαι, in church-hiftory, an appellation given to thofe perfons, who, in the VIIIth century, oppofed image-worfhip; and is ftill given by the church of Rome, to all chriftians who reject the ufe of images in religious matters. See the article IMAGE.

ICOSAHEDRON, in geometry, a regular

lar solid, consisting of twenty triangular pyramids, whose vertexes meet in the center of a sphere, supposed to circumscribe it; and, therefore, have their height and bases equal: wherefore the solidity of one of those pyramids multiplied by 20, the number of bases, gives the solid content of the icosahedron.

If fig. 1. n° 1. plate CXLIV. be nicely drawn on pasteboard, cut half through, and then folded up neatly together, it will represent an icosahedron. *ibid.* n° 2.

ICOSANDRIA, in the linnæan system of botany, a class of plants, the twelfth in order, the characters of which, in so far as it differs from the polyandria, are these; the cup of the flower is monophyllous and hollow, with the corolla affixed by the ungues to its sides, and about twenty stamina inserted either into the side of the cup, or corolla. See the article BOTANY.

The term icosandria is here taken in a lax and indeterminate sense, so as to comprehend all plants with more than twelve stamina, and for the most part not much exceeding twenty. However, the characteristic of the class is rather to be taken from the manner of insertion, than number of the stamina.

To this class belong the cactus or torch-thistle, the amygdalus or almond-tree, the cerasus, or cherry, *&c.* See the articles CACTUS, ALMOND, *&c.*

ICTERIC DISEASE, the same with the jaundice. See the article JAUNDICE.

ICTIAR, in the turkish affairs, an officer who has gone through all the degrees of preferment in his respective body, and consequently has a right to a seat in the divan. See the article DIVAN.

IDA, a mountain in the island of Candia or Crete; also another in Natolia, or lesser Asia, celebrated by the poets for the judgment of Paris on the beauty of the three goddesses, Minerva, Juno, and Venus, to the last of whom he gave the preference.

IDANHA VELHA, a city of Portugal, in the province of Estremadura, forty-six miles north east of Portalegre.

IDEA, in general, the image or resemblance of a thing, which, though not seen, is conceived by the mind. See the article IMAGE.

In logic, idea denotes the immediate object about which the mind is employed, when we perceive or think of any thing.

To account for the formation of our ideas, it is obvious, that the first thing we perceive, in taking a view of what passes within us, is, that we receive impressions from a variety of external objects; that distinct notices are thereby conveyed into the understanding, and that we are conscious of their being there. This attention of the mind to the object's acting upon it, is by logicians called simple apprehension. It is therefore by this means that we come to be furnished with all those ideas about which our thoughts are employed. For when we look at the sun, moon, a man, a tree, or any other object without us, the image or appearance thereof is immediately conveyed to the soul by the organ of sight; and these images the mind has a power or faculty of renewing or calling up again to its view at pleasure, even when the objects that first produced them are removed. Now our ideas are nothing else than these renewed representations of what we have at any time perceived or felt, by means of which things are again brought under the view of the mind; and by variously combining these ideas together, the mind can upon many occasions form to itself representations even of things that never perhaps had any real existence in nature, as mountains of gold, *&c.*

As to the origin or source of our ideas, it is to be observed, that they all have their first rise, and are derived into the understanding, either from the senses, or reflecting upon what passes within ourselves; or, to speak in the language of logicians, from sensation or reflection. From these two great inlets of knowledge the understanding is supplied with all the materials of thinking. For outward objects acting upon our senses, rouze in us a variety of perceptions, according to the different manner in which they affect us; and it is thus that we come by the ideas of light and darkness, heat and cold, sweet and bitter, rough and smooth, and all other impressions which are termed sensible qualities, and which are wholly derived to us from without, and are as numerous as the outward objects that produced them, and the different ways in which our senses are affected by them. This inlet to knowledge, as comprehending all the notices conveyed into the mind by the impulses of external objects upon the organs of sense, is called sensation. But there is yet another source of impressions arising from the attention of the mind

mind to its own acts, when it takes a view of the perceptions lodged there, that were originally furnished by the senses. For these giving the mind an opportunity of exerting its several powers, when we turn the eye of the soul inwards upon them, and take a view of the various ways in which it employs itself about them, we find all our thoughts, under whatever form they appear, are attended with consciousness, and that the understanding is enriched with a new set of perceptions no less distinct than those conveyed in by the senses. It is thus that we come by the ideas of perceiving, thinking, doubting, remembering, willing, *&c.* which are the different acts and workings of the mind itself, represented to us by our own consciousness of what passeth within us. This second source of ideas is called reflection, and presupposes sensation. Besides these two sources there are other ideas derived into our understandings by all the ways of sensation and reflection, as the ideas of pleasure, pain, power, existence, unity, succession, *&c.* See SENSATION and REFLECTION.

From these simple beginnings, all our knowledge, all our discoveries, take their rise: for we can have no perception of the operations of our minds, until they are exerted; nor can they be exerted before the understanding is furnished by the senses with the ideas about which to employ them; as therefore these ideas that give the first employment to our faculties are evidently the perceptions of sense, it is plain that all our knowledge must begin here. Nor shall we among all our discoveries, or that infinite variety of conceptions whereof they consist, be able to point out one original idea, which is not derived from sensation, or reflection, or one complex idea that is not made up of those original ones. This will appear more obvious, if it is considered, that to such as are destitute of any of the inlets by which the perceptions of sense are usually admitted, all the ideas thence arising are absolutely lost; for a blind man can have no idea of light or colours, nor a deaf man form any conception of sound; and the same may be said of the other senses. Hence it follows, that the mind in the reception of all ideas by sensation is wholly passive, and the perceptions produced correspond to the impressions made upon it, are just as nature furnished them, and have no dependance on our will. For when we see a tree, a house, a man, or any other object, they necessarily appear each under its proper form, nor is it in our power to receive from them other ideas than they are fitted to produce.

In tracing the progress of the mind further, we find by experience, that being thus provided with its original characters and notices of things, it has a power of combining, modifying, comparing and examining them in an infinite variety of lights; by which means it is enabled to enlarge the objects of its perception, and thereby to acquire an inexhaustable treasure of other ideas, distinct from the former, though resulting from them; and by the various comparison of its ideas according to such combinations of them as best suits its ends, to exert itself in acts of judging and reasoning, and to push on its views of things from one discovery to another; and thus we see the progress of the soul in its advances to knowledge from the first dawnings of perception. See KNOWLEDGE.

Ideas are variously divided by logicians, but the most natural as well as most useful division of them is into simple and complex ideas; as this division not only comprehends our ideas in all their varieties, but suggests and represents to us the manner and order in which they are introduced into the mind.

Simple ideas, are such of our perceptions, or original notices of things, as are conveyed into or exist in the mind under one uniform appearance, without variety or composition, and are not distinguishable into different ideas. Under this head are included all those ideas that come into the mind by sensation; for tho' external objects convey at once into the understanding many different ideas all united together, and making as it were one whole, and tho' the qualities of bodies that affect our senses are in the things themselves so mixed and united, that there is no separation between them; yet the ideas they produce in the mind are simple and unmixed, and are conceived each under a form peculiar to itself, which cannot be divided into two or more different ideas. Thus the ideas of colour, extension and motion, may be taken in at one and the same time, from the same body; yet these three perceptions are as distinct in themselves, as if all proceeded from different objects, or were exhibited to our notice at different times. Again, some of our simple ideas we acquire purely

purely by means of one ſenſe; as the ideas of colours and ſounds, by the eyes and ears; of taſtes and ſmells, by the palate and noſe; rough and ſmooth, by the touch: others we gain by ſeveral ſenſes, as ſpace, extenſion, figure, &c. others again of our ſimple ideas are ſuggeſted to us by the attention of the mind to what paſſeth within itſelf, or reflection only, as our ideas of conſciouſneſs, perception, volition; others by ſenſation and reflection jointly, as thoſe of pain, pleaſure, power, exiſtence, unity, &c.

Of ſimple ideas, it is proper to obſerve, 1. That they are ſuch as can only be conveyed into the mind, by the proper channels or avenues provided by nature for that purpoſe. 2. That many of our ſimple ideas are not images or reſemblances of any thing inherent in the objects that produced them, as is uſually thought. In order to comprehend this aright, we muſt diſtinguiſh between the primary and ſecondary qualities of bodies that produce theſe ideas. Primary qualities are ſuch as are inſeparable from the body in what ſtate ſoever it be, and ſuch as our ſenſes conſtantly find in every particle of matter, as ſolidity, extenſion, figure, &c. Secondary qualities are ſuch as are, in reality, nothing in the objects themſelves, but only powers to produce various ſenſations in us by means of their primary qualities, that is, by the figure, bulk, texture, &c. of their particles, as colours, ſounds, taſte, ſmell, &c.—Now the ideas of primary qualities are in ſome ſenſe reſemblances of them, and their patterns do really exiſt in the bodies themſelves; but the ideas produced in us by thoſe ſecondary qualities, have no reſemblance of them at all; for there is nothing like our ideas exiſting in the bodies themſelves that occaſion them; and what we call blue, red, ſweet, hot, &c. are in the bodies we denominate from them, no other than a power to produce theſe ſenſations in us.

Complex ideas, are thoſe notions or conceptions of things that reſult from the various combinations and union of our ſimple ideas. Theſe are of two principal kinds, namely, ſuch as are derived from without, and repreſent thoſe combinations of ſimple ideas, that have a real exiſtence in nature, and are conceived to coexiſt in any particular ſubject without us; and ſuch as are formed by the mind itſelf, arbitrarily uniting and putting together its ideas. Of the firſt kind are all our ideas of particular ſubſtances, as gold, ſilver, iron, a tree, a man, a horſe, &c. in which the confuſed idea of ſubſtance, ſuch as it is, is always the chief. And it is to be obſerved, that the mind in the reception of theſe, as well as of ſimple ideas, is wholly paſſive. Of the ſecond kind of complex ideas are all thoſe arbitrary collections of different ideas, which the mind by its own powers occaſionally puts together, by compounding, comparing, diverſifying and uniting its original notices, either for uſe in the commerce of life, or in its purſuit for further knowledge; ſuch are our ideas of ſtated lengths, whether of duration or ſpace, of numbers, and of many human actions; of which it is to be obſerved, that they are manifeſtly the creatures of the mind: for as in the perception of our other ideas, the mind was paſſive; in the formation of theſe, it is active.

This laſt claſs of our complex ideas, may again be ſubdivided, according to the different acts of the mind exerted in framing them, into compound ideas, abſtract ideas, and ideas of relations.

Compound idea, is an aſſemblage of many ſimple ideas united together by the mind, and conſidered by it as one picture or repreſentation, and theſe may be conſidered as of two kinds. 1. Such as are only variations, or different combinations of the ſame ſimple idea without the mixture of any other, as a dozen, a ſcore, which are no more than different aſſemblages of ſo many units, &c. 2. Such as are compounded of ſimple ideas of ſeveral ſorts put together to make one complex one, as beauty, ingratitude, treaſon, &c. See MODE.

Abſtract or general idea, the idea of ſome general quality, or property conſidered ſimply in itſelf, without any reſpect to a particular ſubject. Abſtract ideas are formed by the mind by ſeparating from any of its conceptions, all thoſe circumſtances that render it particular, or the repreſentative of any ſimple determinate object: by which means, ideas taken from particular things become general, and in place of ſtanding for individuals, are each made to denote or repreſent a whole claſs of things. Thus, for inſtance, upon ſeeing a triangle, or circle, the mind by leaving out the conſideration of their particular dimenſion, and every thing elſe peculiar to them as they immediately affect the ſight, and retain-

retaining only the notion of what is common to all triangles or circles, fuch as their figure or fhape, formeth a general or abftract idea applicable to every triangle or circle. And the mind proceeding ftill farther by excluding the confideration of their particular configuration, and whatever is peculiar to them, as figures of a particular form, and retaining only the notion of what is common to all geometrical figures, formeth an idea that is ftill more abftracted or general, applicable to every geometrical figure whatever.

In the fame manner does the mind form the notion of whitenefs in general, by leaving out the confideration of fnow, milk, and every particular fubftance from which we have at any time received that idea. See the articles ABSTRACT *idea*, ABSTRACTION and GENERAL TERMS.

Ideas of relations are a kind of complex ideas arifing from the confideration or comparifon of one idea with another, by examining their mutual refpects, connections, and corefpondencies. It is thus that we acquire the ideas of greater and lefs, older and younger, father and fon, fuperior and inferior, and innumerable others. See RELATION.

Ideas are alfo divided by logicians into adequate and inadequate, clear and obfcure, real and fantaftical.

Adequate ideas are fuch as perfectly reprefent thofe arch-types that the mind fuppofes them taken from, in all their parts and properties. The idea of a circle, which reprefents it as a round figure bounded by a curve line, whofe parts are all equally diftant from a point in the center, is an adequate idea thereof.

Inadequate ideas are fuch as do but partially, or imperfectly, reprefent thofe arch-types to which they are referred. See the article ADEQUATE, *&c.*

Clear or diftinct ideas are fuch as reprefent the objects to us fo, as that when they occur to us again, we can not only readily know them, but eafily diftinguifh them from all others; the contrary whereof is what are called obfcure or confufed ideas. For inftance, the moft illiterate, upon feeing the fun or moon, have fo clear an idea of them, as eafily to know and diftinguifh them again from any other planet or fixed ftar; but have not fo diftinct or clear an idea of jupiter, mars, or the other planets when once pointed out to them, as to know them again from one another, or from the fixed ftars.

Real ideas are fuch as have a foundation in nature, or a conformity with the real being or exiftence of things.

Fantaftical ideas are fuch as have no foundation in nature, or a conformity with the real being or exiftence of things, nor any arch-types to which they have a conformity.

IDENTITATE NOMINIS, in law, a writ that lies where a perfon is imprifoned inftead of another of the fame name, commanding the fheriff to enquire whether the prifoner be the perfon, againft whom the action was brought, or not; and if not, to difcharge him.

IDENTITY, SAMENESS, denotes that by which a thing is itfelf, and not any thing elfe; in which fenfe, identity differs from fimilitude as well as diverfity. The idea of identity we owe to that power which the mind has of comparing the very being and exiftence of things, whereby confidering any thing as exifting at any certain time and place, and comparing it with itfelf as exifting at any other time and place, we accordingly pronounce it the fame, or different. Thus when we fee a man at any time and place, and compare him with himfelf when we fee him again at any other time or place, we pronounce him to be the fame we faw before. See the article SIMILITUDE and DIVERSITY.

To underftand identity aright, we ought to confider the effence and exiftence, and the ideas thefe words ftand for; it being one thing to be the fame fubftance; another, the fame man; and a third, the fame perfon. For, fuppofe an atom exifting at a determined time and place, it is the fame with itfelf, and will continue fo to be at any other inftant as long as its exiftence continues; and the fame may be faid of two or any number of atoms, whilft they continue together; the mafs will be the fame; but if one atom be taken away, it is not the fame mafs. In animated beings it is otherwife, for the identity does not depend on the cohefion of its conftituent particles, any how united in one mafs; but on fuch a difpofition and organization of parts, as is fit to receive and diftribute life and nourifhment to the whole frame. Man therefore, who hath fuch an organization of parts partaking of one common life, continues to be the fame man, tho' that life be communicated to new fucceeding particles of matter vitaly united to the fame organized body; and in this confifts the identity of man,

man, conſidered as an animal only. But perſonal identity, or the ſameneſs of an intelligent being, conſiſts in a continued conſciouſneſs of its being a thinking being, endowed with reaſon and reflection, capable of pain or pleaſure, happineſs or miſery, that conſiders itſelf the ſame thing in different times and places. By this conſciouſneſs every one is to himſelf, what he calls *ſelf*, without conſidering, whether that *ſelf* be continued in the ſame or divers ſubſtances; and ſo far as this conſciouſneſs extends backward to any paſt action, or thought, ſo far extends the identity of that perſon, and makes it the object of reward and puniſhment. Hence it follows, that if the conſciouſneſs went with the hand, or any other limb when ſevered from the body, it would be the ſame ſelf that was juſt before concerned for the whole. And if it were poſſible for the ſame man to have a diſtinct incommunicable conſciouſneſs at different times, he would without doubt at different times make different perſons; which we ſee is the ſenſe of mankind as to madmen, for human laws do not puniſh the madman for the ſober man's actions, nor the ſober man for what the madman did, thereby conſidering them as two perſons.

IDEOT, or IDIOT. See IDIOT.

IDES, *idus*, in the antient roman calendar, were eight days in each month; the firſt of which fell on the 15th of March, May, July, and October; and on the 13th day of the other months.

They were reckoned backwards, in the manner already explained under the article CALENDS.

Thus they called the 14th day of March, May, July and October; and the 12th of the other months, the *pridie idus*, or the day before the ides; the next preceding day, they called the *tertio idus*; and ſo on, reckoning always backwards, till they came to the nones. See NONES. This method of reckoning time is ſtill retained in the chancery of Rome, and in the calendar of the breviary.

IDIOM, ἰδίωμα, among grammarians, properly ſignifies the peculiar genius of each language, but is often uſed in a ſynonymous ſenſe with dialect. See the articles LANGUAGE and DIALECT.

IDIOPATHY, in phyſic, a diſorder peculiar to a certain part of the body, and not ariſing from any preceding diſeaſe; in which ſenſe, it is oppoſed to ſympathetic. Thus, an epilepſy is idiopathic, when it happens merely thro' ſome fault in the brain; and ſympathetic, when it is the conſequence of ſome other diſorder.

IDIOSYNCRASY, among phyſicians, denotes a peculiar temperament of body, whereby it is rendered more liable to certain diſorders, than perſons of a different conſtitution uſually are. See the article TEMPERAMENT.

IDIOT, or IDEOT, a perſon that is born a natural fool.

Such a perſon is not to be proſecuted for any crime, as not having knowledge to diſtinguiſh good from evil; yet it is ſaid, that if a man has ſo much knowledge as to meaſure a yard of cloth, tell or number twenty-pence in ſmall money, or regularly to name the days of the week, or to beget a child, he ſhall not, by our laws, be accounted an ideot.

The king has a right to the cuſtody of an idiot's lands, and to receive the profits of the ſame during his life, without committing waſte; and finding him and his family, if he have any, neceſſaries.

IDOLATRY, εἰδωλολατρεία, a word of greek original, compounded of εἴδωλον an image, and λατρεύειν, to worſhip or ſerve. Idolatry, or the worſhip of idols, may be diſtinguiſhed into two ſorts. By the firſt, men adore the works of Gods, the ſun, the moon, the ſtars, angels, dæmons, men and animals: by the ſecond, men worſhip the work of their own hands, as ſtatues, pictures, and the like: and to theſe may be added a third, that by which men have worſhipped the true God under ſenſible figures and repreſentations. This indeed may have been the caſe with reſpect to each of the above kinds of idolatry; and thus the Iſraelites adored God under the figure of a calf.

Some authors make idolatry to be more antient than the deluge, and believe that it began in the time of Enos; for which they cite the laſt verſe of the fourth chapter of Geneſis, where, according to our verſion, it is ſaid, "Then began "men to call upon the name of the "Lord;" but which theſe authors render, "Then began men to profane the "name of the Lord;" that is, to corrupt the worſhip of God by idolatry. "At this time, ſays Maimonides, men "began to ſtudy the motions of the "heavenly bodies, and from thence were "led to think, that they were the miniſters of God in the government of "the world. This induced them to "praiſe, honour and adore the ſtars, as

"his officers or substitutes, and upon "this foundation, they erected temples, "and offered sacrifices to the heavenly "bodies."

Others are of opinion, that idolatry did not begin till after the deluge, and that it had its rise in Babylon; where divine honours were first paid to Jupiter Belus. If this be the truth of the case, it may not be improbable that the idolatry and polytheism which prevailed after the deluge, might spring from the impiety and atheism before the deluge: for it being natural for men to pass from one extreme to another, those who lived immediately after the deluge, and had been, as it were, witnesses of the punishment inflicted on atheism and impiety, might by ignorance be led to superstition; and for fear of relapsing into atheism, which had destroyed the world, might set up the worship of an infinite number of gods. This is not to be understood of Noah himself, or his sons, who must be supposed to have had the knowledge of the true god; but of their descendants, upon the division of tongues and dispersion of the people.

However this be, it seems clear, that the stars were the first objects of idolatrous worship; and that on account of their beauty, their influence on the productions of the earth, and the regularity of their motions, particularly the sun and moon, which were considered as the most glorious and resplendent images of the deity: afterwards, as their sentiments became more corrupted, they began to form images, and to entertain the opinion, that by virtue of consecration, the gods were called down, to inhabit or dwell in their statues. Hence Arnobius takes occasion to rally the pagans for guarding so carefully the statues of their gods, who, if they were really present in their images, might save their worshippers the trouble of securing them from thieves and robbers. For the pagan gods, see the article God.

As to the adoration which the antient pagans paid to the statues of their gods; it is certain that the wiser and more sensible heathens considered them only as simple representations of figures designed to recal to their minds the memory of their gods. This was the opinion of Varro and Seneca: and the same sentiment is clearly laid down in Plato, who maintains, that images are inanimate, and that all the honour paid to them has respect to the gods whom they represent. But as to the vulgar, they were stupid enough to believe the statues themselves to be gods, and to pay divine worship to stocks and stones.

Soon after the flood, idolatry seems to have been the prevailing religion of all the world; for wherever we cast our eyes at the time of Abraham, we scarcely see any thing but false worship and idolatry. And it appears from scripture, that Abraham's forefathers, and even Abraham himself, were for a time idolaters. The Hebrews were indeed expressly forbidden to make any representation of God; they were not so much as to look upon an idol: and from the time of the Maccabees to the destruction of Jerusalem, the Jews extended this precept to the making the figure of any man: by the laws of Moses, they were obliged to destroy all the images they found, and were forbidden to apply any of the gold or silver to their own use, that no one might receive the least profit from any thing belonging to an idol. Of this the Jews, after they had smarted for their idolatry, were so sensible, that they thought it unlawful to use any vessel that had been employed in sacrificing to a false god; to warm themselves with the wood of a grove, after it was cut down; or to shelter themselves under its shade.

But the preaching of the christian religion, wherever it prevailed, entirely rooted out idolatry, as did also that of Mahomet, which is built on the worship of one God. It must not, however, be forgotten, that the protestant christians charge those of the church of Rome with paying an idolatrous kind of worship to the pictures or images of saints and martyrs: before these, they burn lamps and wax candles; before these, they burn incense, and kneeling offer up their vows and petitions: they, like the pagans, believe that the saint to whom the image is dedicated, presides in a particular manner about its shrine, and works miracles by the intervention of its image; and that if the image was destroyed or taken away, the saint would no longer perform any miracle in that place.

IDYLLION, εἰδύλλιον, in antient poetry, is only a diminutive of the word εἶδος, and properly signifies any poem of moderate extent, without considering the subject. But as the collection of Theocritus's poems, were called idyllia, and the

pastoral

pastoral pieces being by far the best in that collection, the term idyllion seems to be now appropriated to pastoral pieces. See the article PASTORAL POETRY.

So very different are our modern idyllions from those of the antients, by introducing none but allegorical shepherds, that a literal translation of Theocritus's idyllions, however well executed, would be relished only by people of taste, and those too well acquainted with the simplicity and manners of the antients.

JEALOUSY, in general, denotes the fear of a rival; but is more especially understood of the suspicion, which married people entertain of each others fidelity and affection.

Bitter waters of JEALOUSY, in jewish antiquity, certain consecrated waters, which a woman was obliged to drink, in order to clear herself of the crime of adultery, whereof her jealous husband accused her; the consequence of which draught was, that if innocent she suffered no harm, but if guilty her belly swelled, *&c.*

JEAN DE ANGELI, a town of Guienne, in France, thirty five miles south-east of Rochelle.

JEAN DE LUZ, a port of France, in the province of Gascony, situated near the frontiers of Spain: west long 1° 32′, north lat. 43° 30′.

JEAN DE MAURIENNE, a city in the dutchy of Savoy, thirty miles south-east of Chamberry: east long. 6° 8′, north lat. 45° 16′.

JEAN PIED DE PORT, a town of the province of Navarre, in France, situated on the river Nive, on the frontiers of Spain: west long 1° 20′, north lat. 43° 16′.

JECORINUS, in ichthyology, a fish, otherwise called hepatus. See the article HEPATUS.

JECUR, the LIVER, in anatomy. See the article LIVER.

JECUR UTERINUM, in anatomy, a name by which some call the placenta. See the article PLACENTA.

JEDBURGH, the capital of Tiviotdale or Roxburgh, in Scotland, thirty six miles south-east of Edinburgh: west long. 2° 15′, north lat. 55° 25′.

JEDDO, the capital city of Japan Proper, situated on the east-side of the island: east long. 141° north lat. 36°.

The splendor of the royal palace and public buildings of this city, in the opinion of those Europeans who have seen it, is no where to be equalled. The emperor's palace and gardens, which are in the middle of the city, are five miles in circumference. All the houses are built upon one floor, and the rooms are only divided by folding screens.

JEER, or JEER-ROPE, in a ship, is a large rope reeved thro' double or treble blocks, lashed at the mast head, and on the yard, in order to hoist or lower the yards.

JEERS, or, being brought to the jeers, in the sea-language, signifies a person's being punished at the jeer-capstan, by having his arms extended cross-wise, and tied to the capstan-bar when thrust thro' the barrel, and standing thus, with a heavy weight about his neck. In this posture he is obliged to continue till he is either brought to confess some crime of which he is accused, or has suffered the punishment which the captain has sentenced him to undergo.

JEHOVAH, one of the scripture names of God, signifying the Being who is self-existent, and gives existence to others. See the article GOD.

So great a veneration had the Jews for this name, that they left off the custom of pronouncing it, whereby its true pronunciation was forgotten. They call it tetragrammaton, or the name with four letters; and believe, that whoever knows the true pronunciation of it cannot fail to be heard by God.

JEJUNUM, in anatomy, the second of the small guts, so called because it is usually found empty. This is owing to the fluidity of the chyle, the greater stimulus of the bile in it, and the abundance of the lacteal vessels with which it is furnished. Its situation is in the region above the navel; it has a great many connivent glands. Its beginning is where the duodenum ends; and it terminates, where these valves are obliterated: its length is different in various subjects; but is usually between thirteen and sixteen spans. See INTESTINES.

JEKYL, a small island in the mouth of the river Alatamaha, in Georgia, fortified by general Oglethorp.

JEMPTERLAND, *Jemptia*, a province of Sweden, bounded by Angermania on the north; by Medelpadia on the east, by Helsingia on the south, and by Norway on the west.

JENA, a city of Germany, in the circle of Upper Saxony, and the Langraviate of Thuringia: east long. 11° 44′, north lat. 51°.

JENDE, a great lake, in the province of Finland, in Sweden.

JENISA, a large river of Ruſſia, that runs from ſouth to north thro' Siberia, and falls into the frozen ocean in 72° of eaſt longitude, and 70° of north lat.

JENKOPING, a city of Sweden, in the province of Gothland, ſituated ninety miles ſouth-eaſt of Gottenburg: eaſt long 14° 30′, north 57° 30′.

JENO, or GENO, a town of Upper Hungary, twenty miles ſouth of Great Waradin, and ſubject to the houſe of Auſtria.

JENTLING, in ichthyology, the blue chub, a fiſh caught in the Danube, and larger than the common chub. See the article CHUB.

JEOFAILE, or JEOFAYLE, in law, a term uſed for any overſight in pleading, or any other proceedings at law.

The ſhewing of theſe defects or overſights, was formerly often practiſed by the counſel; and when the jury came into court, in order to try the iſſue, they ſaid, this inqueſt you ought not to take; and after verdict they would ſay to the court, to judgment you ought not to go: but ſeveral ſtatutes have been made to avoid the delays occaſioned by ſuch ſuggeſtions; and a judgment is not to be ſtayed after verdict for miſtaking the chriſtian or ſurname of either of the parties, or in a ſum of money, or in the day, month, year, &c. where the ſame are rightly named in any preceding record.

JEREMIAH, *the prophecy of*, a canonical book of the Old Teſtament. This divine writer was of the race of the prieſts, the ſon of Hilkiah of Anathoth, in the tribe of Benjamin. He was called to the prophetic office when very young, about the thirteenth of Joſiah, and continued in the diſcharge of it above forty years. He was not carried captive to Babylon with the other Jews, but remained in Judea to lament the deſolation of his country. He was afterwards a priſoner in Egypt with his diſciple Baruch, where it is ſuppoſed he died in a very advanced age. Some of the chriſtian fathers tell us, he was ſtoned to death by the Jews, for preaching againſt their idolatry; and ſome ſay, he was put to death by Pharoh Hophra, becauſe of his prophecy againſt him. Part of the prophecy of Jeremiah relates to the time after the captivity of Iſrael, and before that of Judah, from the firſt chapter to the forty-fourth; and part of it was in the time of the latter captivity, from the forty-fourth chapter to the end. The prophet lays open the ſins of Judah with great freedom and boldneſs, and reminds them of the ſevere judgments, which had befallen the ten tribes for the ſame offences. He paſſionately laments their misfortune, and recommends a ſpeedy reformation to them. Afterwards he predicts the grievous calamities that were approaching, particularly the ſeventy years captivity in Chaldæa. He likewiſe foretells their deliverance and happy return, and the recompence which Babylon, Moab, and other enemies of the Jews ſhould meet with in due time. There are likewiſe ſeveral intimations in this prophecy concerning the kingdom of the Meſſiah; alſo ſeveral remarkable viſions, and types, and hiſtorical paſſages relating to thoſe times. The fifty-ſecond chapter does not belong to the prophecy of Jeremiah, which probably was added by Ezra, and contains a narrative of the taking of Jeruſalem, and of what happened during the captivity of the Jews, to the death of Jechonias. St. Jerom has obſerved upon this prophet, that his ſtile is more eaſy than that of Iſaiah and Hoſea; that he retains ſomething of the ruſticity of the village where he was born; but that he is very learned, and majeſtic, and equal to thoſe two prophets in the ſenſe of his prophecy.

JERSEY, an iſland in the engliſh channel, fifteen miles weſt of the coaſt of Normandy, and eighty miles ſouth of Portland in Dorſetſhire: weſt long. 2° 20′, north lat. 49° 20′.

It is about 30 miles in circumference, and contains twelve pariſhes, the chief town is St. Hillary. Though the iſland is ſubject to England, the inhabitants are ſtill governed by Norman laws, and the courts of England have no juriſdiction there.

New JERSEY, a province in North America, which may be bounded on the north by a line drawn from the river Delawar to Hudſon's river, which divides it from New-York; by the Atlantic Ocean, on the eaſt; by the ſame ocean on the ſouth, and by Delawar bay and river, which ſeparates it from Penſilvania, on the weſt. It lies between 74° and 76° of weſt long. and between 39° and 41° of north lat. and is about 140 miles in length, and 60 in breadth. It is ſubject to England. The chief towns are Burlington, Perth-Amboy, and Elizabeth Town. It produces corn, black cattle, furs, and pipe-ſtaves.

JERUSALEM, the capital city of Judea, or Paleſtine, in Aſiatic Turky, ſituated thirty miles eaſt of the Levant, or Mediterranean

diterranean Sea, and ninety miles fouth of Damafcus: eaft long. 36°, north lat. 32°.

It ftands on a high rock, with fteep afcents on every fide, except on the north, and is furrounded with a deep valley, which is again incompaffed with hills. The city is at prefent three miles in circumference, and has a little altered its fituation; for Mount Calvary, which was formerly without the walls, ftands now in the middle of the city, and Mount Sion, which ftood near the center, is now without the walls.

JESI, a city of Italy, in the province of Ancona, and territory of the pope: eaft long. 14° 40′, north lat. 43° 45′.

JESSE, a branched candleftick, or fconce; an ufeful ornament, firft introduced into our churches about the year 1100.

JESSELMERE, the capital of the province of the fame name in the Eaft-Indies, fubject to the Mogul: eaft long. 73° 20′, north lat. 27°.

JESSO, or YEDSO, a country of Afia, which lies north of Japan, and is faid to extend north-eaft to the continent of America: eaft longitude 140°, north latitude 40°.

JESUAT, a province of India, bounded by Patan on the north, and by Bengal on the fouth; fubject to the mogul.

JESUITES, or the fociety of Jefus, a moft famous religious order in the romifh church, founded by Ignatius Loyola, a native of Guipufcoa in Spain, who in the year 1538, affembled ten of his companions at Rome, principally chofen out of the univerfity of Paris, and made a propofal to them to form a new order; when, after many deliberations, it was agreed to add to the three ordinary vows of chaftity, poverty, and obedience, a fourth; which was, to go into all countries whether the pope fhould pleafe to fend them, in order to make converts to the romifh church. Two years after, pope Paul III. gave them a bull, by which he approved this new order, giving them a power to make fuch ftatutes as they fhould judge convenient: on which, Ignatius was created general of the order; which in a fhort time fpread over all the countries of the world, to which Ignatius fent his companions, while he ftaid at Rome, from whence he governed the whole fociety.

The entire fociety is compofed of four forts of members; novices, fcholars, fpiritual and temporal coadjutors, and profeffed members. The novices continue fo two years, after which they are admitted to make the three fimple vows, of chaftity, poverty and obedience, in the prefence of their fuperiors: the fcholars add fome fpiritual exercifes to their ftudies. The fpiritual coadjutors affift the profeffed members, and alfo make the three fimple vows: the temporal coadjutors, or lay-brothers, take care of the temporal affairs of the fociety; and the profeffed members, which compofe the body of the fociety, befides the three fimple vows, add a fpecial vow of obedience to the head of the church in every thing relating to miffions among idolaters and heretics. They have profeffed houfes for their profeffed members and their coadjutors; colleges, in which the fciences are taught to ftrangers; and feminaries, in which the young jefuits go thro' a courfe of philofophy and theology. They are governed by a general, who has four affiftants, and who appoints rectors, fuperiors of houfes, provincials, vifitors, and commiffaries. The difcipline of thefe houfes, and efpecially of the colleges, was regulated by Ignatius himfelf.

JESUITS POWDER. See POWDER.

JET, *gagates*, in natural hiftory, a folid, dry, opake, inflammable fubftance, found in large detached maffes, of a fine and regular ftructure, having a grain like that of wood, fplitting more eafily horizontally than in any other direction, very light, moderately hard, not fufible, but readily inflammable, and burning a long time with a fine greenifh flame.

It is of a fine deep black colour, very gloffy and fhining, except upon its furface, where it has been fouled by accident. When examined by the microfcope, it is found to be compofed of a number of parallel plates, very thin, and laid clofely upon one another. It is not foluble in, nor makes any effervefcence with acids. It fhould be chofen of the deepeft black, of a moderate hardnefs, very light, and fuch as will fplit moft evenly in an horizontal direction; this being its great characteriftic, by which it is diftinguifhed from the cannel-coal, which breaks equally eafy any way.

Jet is of great ufe to perfumers, and is fometimes prefcribed in medicine. Diofcorides tells us, that it is an excellent emollient and difcutient, and recommends a fumigation of it for difeafes of the womb; and among the eaftern nations,

tions, it is ftill in high repute as a cordial, a ftrengthener, and prolonger of life.

Every pound of jet pays on importation a duty of $7\frac{70}{100}$d. and draws back $6\frac{75}{100}$d. on exportation.

JET D'EAU, a french term, frequently alfo ufed with us, for a fountain that cafts up water to a confiderable height in the air. See the article FOUNTAIN.

JETSON, JETSEN, or JETSAM, in law, is ufed for any thing thrown out of a fhip or veffel that is in danger of being a wreck, and which is driven by the waves on fhore. See FLOTSON.

JEVER, a town of Germany, in the circle of Weftphalia, fixteen miles north-eaft of Embden: eaft long. 7° 5′, north lat. 53° 50′.

JEWEL, any precious ftone, or ornament befet with them. See the articles, DIAMOND, RUBY, &c.

JEWEL-OFFICE, an office belonging to the crown, that has the charge of fafhioning and weighing the king's plate, and delivering it out by warrants from the lord chamberlain.

The principal officer is the mafter of the jewel-office, who has a falary of 450 l. per annum.

JEWS, thofe who profefs obedience to the laws and religion of Mofes, before whom every man worfhipped God according to the inclination of his own heart.

How far the religious ceremonies of the Jews were copied from thofe of the Egyptians, among whom they had fo long fojourned, or how far they were typical of fomething future, are queftions which we leave to be difcuffed by divines. But as to the religion of the modern Jews, it is a manifeft abfurdity; fince being without a temple, facrifices, &c. it cannot be confidered as fubfifting any longer.

Be this as it will, we fhall fubjoin a few of their mifcellaneous cuftoms, as related by Leo of Modena, an author of their own.

When a Jew builds an houfe, he muft leave part of it unfurnifhed, in remembrance that the temple and Jerufalem now lie defolate. They lay great ftrefs upon frequent wafhings. They abftain from meats prohibited by the levitical law; for which reafon, whatever they eat muft be dreffed by Jews, and after a manner peculiar to themfelves. Every Jew is obliged to marry, and a man who lives to twenty unmarried, is accounted as actually living in fin.

The Jews, it is faid, were formerly at the difpofal of the chief lord where they lived, and likewife all their goods. A Jew may be a witnefs by our law, being fworn on the Old Teftament, and taking the oaths to the government.

For a farther account of the Jews, fee the articles CARAITES, CIRCUMCISION, LEVITES, PASSOVER, PHARISEES, RABBI, SADDUCEES, SANHEDRIM, SYNAGOGUE, TALMUD, &c.

JEW'S STONE, *lapis judaicus*, in the materia medica, an extraneous foffile, being nothing but the petrified fpine of a large echinus marinus. It is of the figure of an olive, and is furrowed and ridged alternately in a longitudinal direction. It is folid, confiderably heavy, and difficult to break; being, indeed, a petrefaction folely compofed of fpar, and that tolerably pure. Hence, it is faid to be a great dieuretic and lithontriptic; and that it poffeffes the former of thefe virtues is very certain, but it is not equally fure that it has any thing of the other. It acts in this cafe as mere fpar, all the fpar in the world, whether in its folid form, or in a natural ftate of folution in water, being diuretic. The lapis judaicus is given in an impalpable powder, and the dofe is from one fcruple to a dram.

JEWISH HOURS, in chronology. See the article HOUR.

JEZIDES, among the mohometans, a term of fimilar import with heretics among chriftians.

The jezides are a numerous fect inhabiting Turky and Perfia, fo called from their head Jezid, an arabian prince, who flew the fons of Ali, Mahomet's father-in-law, for which reafon he is reckoned a parricide, and his followers heretics. There are about 200,000 jezides in Turky and Perfia; who are of two forts, black and white. The white are clad like Turks, and diftinguifhed only by their fkirts, which are not flit at the neck like thofe of others, but have only a round hole to thruft their heads thro'. This is in memory of a golden ring, or circle of light, which defcended from heaven upon the neck of their cheq, the head of their religion, after his undergoing a faft of forty days. The black jezides, tho' married, are the monks or religious of the order; and thefe are called Fakirs.

The Turks exact exceffive taxes from the Jezides, who hate the Turks as their

mortal

mortal enemies, and when, in their wrath, they curfe any creature, they call it muffulman : but they are great lovers of the chriftians, being more fond of Jefus Chrift than of Mahomet, and are never circumcifed but when forced to it. They are extremely ignorant, and believe both the bible and the koran without reading either of them ; they make vows and pilgrimages, but have no places of religious worfhip.

All the adoration they pay to God confifts of fome fongs in honour of Jefus Chrift, the Virgin, Mofes, and fometimes Mahomet; and it is a principal point of their religion never to fpeak ill of the devil, left he fhould refent the injury, if ever he fhould come to be in favour with God again, which they think poffible : whenever they fpeak of him, they call him the Angel Peacock. They bury their dead in the firft place they come at, rejoicing as at a feftival, and celebrating the entry of the deceafed into heaven. They go in companies like the Arabians, and change their habitations every fifteen days. When they get wine, they drink it to excefs, and it is faid, that they fometimes do this with a religious purpofe, calling it the blood of Chrift. They buy their wives, and the market price is two hundred crowns for all women, handfome or not, without diftinction.

IGLAW, a town of Germany, in the province of Moravia, fituated on the river Igla, on the frontiers of Bohemia ; fubject to the houfe of Auftria : eaft long. 15° 7′, north lat. 49° 16′.

IGNIS, FIRE, in phyfiology, chemiftry, &c. See the article FIRE.

IGNIS-AQUA, Helmont's name for the alkaheft. See ALKAHEST.

IGNIS-FATUUS, in meteorology, a meteor otherwife called, will-with-a-wifp. See the article WILL-*with-a-wifp*.

IGNIS GEHENNÆ, the fame with the univerfal diffolvent, or alkaheft. See the article ALKAHEST.

IGNIS JUDICII, in our old cuftoms, a purgation by fire. See ORDEAL.

IGNISPICIUM, in antiquity, a fpecies of pyromancy, wherein predictions were drawn from the fire ufed in facrifices. See PYROMANCY and DIVINATION.

IGNITION, in chemiftry the heating metals red-hot, without melting them. Lead and tin are too foft, to bear ignition; which takes effect only in the harder metals, as gold and filver, but efpecially iron.

IGNORAMUS, in law, a term which fignifies we are ignorant. This is ufed when the grand jury impanelled on the inquifition of criminal caufes, reject the evidence as too weak to make good the prefentment or indictment brought againft a perfon, fo as to bring him upon his trial by a petty jury ; in which cafe, they indorfe this word on the back of the bill of indictment. In confequence of which, all further proceedings againft the party accufed are ftopped, and the fuppofed offender is delivered without further anfwer.

IGNORANCE, *ignorantia*, the privation or abfence of knowledge. See the article KNOWLEDGE.

The caufes of ignorance, according to Locke, are chiefly thefe three. 1. Want of ideas. 2. Want of a difcoverable connection between the ideas we have. 3. Want of tracing and examining our ideas. See the article IDEA.

As to the firft of thefe caufes, he obferves, that all the fimple ideas we have, are confined to the obfervation of our fenfes, and the operations of our own mind, which we are confcious of in ourfelves. What other ideas it is poffible other creatures may have, by the affiftance of other fenfes and faculties, more or perfecter than we have, or different from ours, it is not for us to determine ; but to fay or think there are no fuch, becaufe we conceive nothing of them, is no better an argument than if a blind man fhould be pofitive, that there was no fuch thing as fight and colours, becaufe he had no manner of idea of any fuch thing. What faculties, therefore, other fpecies of creatures have to penetrate into the nature and inmoft conftitutions of things, we know not. This we know, and certainly find, that we want other views of them befides thofe we have, to make difcoveries of them more perfect. The intellectual and fenfible world are in this perfectly alike, that the parts which we fee of either of them, hold no proportion with that we do not fee ; and whatfoever we can reach with our eyes, or our thoughts, of either of them, is but a point, and almoft nothing in comparifon of the reft.

Another great caufe of ignorance, is the want of thofe ideas we are capable of. This keeps us in ignorance of things which we conceive capable of being known.

known. We have ideas of bulk, figure, and motion: yet not knowing what is the particular bulk, motion, and figure of the greateſt part of the bodies of the univerſe, we are ignorant of the ſeveral powers, efficacies, and ways of operation, by which the effects we daily ſee are produced. Theſe are hid from us, in ſome things, by being too remote; in others, by being too minute.

When we conſider the vaſt diſtance of the known and viſible parts of the world, and the reaſon we have to think, that what lies within our ken, is but a ſmall part of the immenſe univerſe, we ſhall then diſcover an huge abyſs of ignorance. What are the particular fabrics of the great maſſes of matter which make up the whole ſtupendous frame of corporeal beings, how far they are extended, and what is their motion, and how continued, and what influence they have upon one another, are contemplations in which at the firſt glimpſe our thoughts are loſt. If we confine our thoughts to this little canton, I mean this ſyſtem of our ſun, and the groſſer maſſes of matter that viſibly move about it; what ſeveral ſorts of vegetables, animals, and intellectual corporeal beings, infinitely different from thoſe of our little ſpot of the earth, may probably be in other planets, to the knowledge of which, even of their outward figures and parts, we can no way attain while we are confined to this earth, there being no natural means, either by ſenſation or reflection, to convey their certain ideas into our minds?

There are other bodies in the univerſe no leſs concealed from us by their minuteneſs. Theſe inſenſible corpuſcles being the active parts of matter, and the great inſtruments of nature, on which depend all their ſecondary qualities and operations, our want of preciſe diſtinct ideas of their primary qualities, keeps us in incurable ignorance of what we deſire to know about them. Did we know the mechanical affections of rhubarb or opium, we might as eaſily account for their operations of purging and cauſing ſleep, as a watchmaker can for the motions of his watch. The diſſolving of ſilver in aqua fortis, or gold in aqua regia, and not *vice verſa*, would be then perhaps no more difficult to know, than it is to a ſmith to underſtand why the turning of one key will open a lock, and not the turning of another. But while we are deſtitute of ſenſes, acute enough to diſcover the minute particles of bodies, and to give us ideas of their mechanical affections, we muſt be content to be ignorant of their properties and operation; nor can we be aſſured about them any farther, than ſome few trials we make, are able to reach: but whether they will ſucceed again another time, we cannot be certain. This hinders our certain knowledge of univerſal truths concerning natural bodies: and herein our reaſon carries us very little beyond particular matters of fact. And therefore I am apt to doubt, that how far ſoever human induſtry may advance uſeful and experimental philoſophy in phyſical things, yet the ſcientifical will ſtill be out of our reach; becauſe we want perfect and adequate ideas of thoſe very bodies which are neareſt to us, and moſt under our command.

This, at firſt ſight, ſhews us how diſproportionate our knowledge is to the whole extent even of material beings: to which if we add the conſideration of that infinite number of ſpirits that may be, and probably are, which are yet more remote from our knowledge, of which we have no cognizance, we ſhall find this cauſe of ignorance, conceal in an impenetrable obſcurity, almoſt the whole intellectual world; a greater certainly, and a more beautiful world than the material. For bating ſome very few ideas of ſpirit, which we get from our own minds by reflection, and from thence the beſt we can collect of the father of all ſpirits, the author of them and us, and all things, we have no certain information, ſo much as of the exiſtence of other ſpirits, but by revelation; much leſs have we diſtinct ideas of their different natures, ſtates, powers, and ſeveral conſtitutions, in which they either agree or differ one from another, and from us. And therefore in what concerns their different ſpecies and properties, we are under an abſolute ignorance.

The ſecond cauſe of ignorance is the want of a diſcoverable connection between thoſe ideas we have: where we want that, we are utterly incapable of univerſal and certain knowledge; and are, as in the former caſe, left only to obſervation and experiment. Thus the mechanical affections of bodies, having no affinity at all with the ideas they produce in us, we can have no diſtinct knowledge of ſuch operations beyond our experience; and can reaſon no otherwiſe about

about them, than as the effects or appointment of an infinitely wise agent, which perfectly surpass our comprehensions.

The operation of our minds upon our bodies is as inconceivable. How any thought should produce a motion in body, is as remote from the nature of our ideas, as how any body should produce any thought in the mind. If experience did not convince us that it is so, the consideration of the things themselves would never be able, in the least, to discover it to us.

In some of our ideas there are certain relations, habitudes and connections so visibly included in the nature of the ideas themselves, that we cannot conceive them separable from them by any power whatsoever: in these only, we are capable of certain and universal knowledge. Thus the idea of a right-lined triangle, necessarily carries with it an equality of its angles to two right ones. But the coherence and continuity of the parts of matter, the production of sensation in us, of colours and sounds, &c. by impulse and motion, being such in which we can discover no natural connection with any ideas we have, we cannot but ascribe them to the arbitrary will and good pleasure of the wise architect.

The things which we observe always proceed regularly, we may conclude, act by a law that is set them, but yet by a law that we know not; by which, tho' causes work steadily, and effects constantly flow from them, yet their connections and dependencies not being discoverable in our ideas, we can only have an experimental knowledge of them. Several effects come every day within the notice of our senses, of which we have so far sensible knowledge; but of the causes, manner, and certainty of their production, we must for the foregoing reasons be content to be ignorant. In these we can go no farther than particular experience informs us of matter of fact, and by analogy, guess what effects the like bodies are, upon other trials, like to produce.

The third cause of ignorance is our want of tracing those ideas we have, or may have, and finding out those intermediate ideas which may shew us what habitude of agreement or disagreement they may have one with another. Thus many are ignorant of mathematical truths, for want of application in enquiring, examining, and by due ways comparing those ideas.

IGNORANCE, in law, is a want of knowledge of the laws, which will not excuse a person from suffering the penalty inflicted on the breach of them: for every one is obliged, at his peril, to know the laws of the land. An infant who is just arrived at the age of discretion, and who may therefore be supposed to be ignorant of the law, is punishable for crimes; but at the same time infants of tender age, who are naturally ignorant, are excused. This is also the case with respect to persons who are non compos mentis. See INFANT, LUNATIC, &c.

IGUANA, in zoology, an american species of lizard, with a long round tail, five toes on each foot, and the crest of the throat and the dorsal suture dentated. See the article LIZARD.

IHOR, the capital of the province of Ihor, in Malacca, near the south cape of the further peninsula of India, subject to the Dutch: east long. 103°, north lat. 3°.

JIG, or GIGG, in music. See GIGG.

ILCHESTER, a borough-town of Somersetshire, fourteen miles south of Wells. It sends two members to parliament.

ILDEFONSO, a palace belonging to the king of Spain.

ILEX, the HOLM OAK, or EVER-GREEN-OAK, in botany, a genus of the tetrandria-tetragynia class of plants, the flower of which consists of one plain petal, divided into four roundish, hollow, and open segments, cohering only at their bottoms: the fruit is a roundish berry, with four cells, each of which contains a single, hard, oblong, and obtuse seed, gibbous on one side, and angular on the other.

The wood of these trees is accounted very good for many sorts of tools and utensils, as mallet-heads, mall-balls, chairs, wedges, beetles, pins, &c. as also for palisadoes. It likewise affords the most durable charcoal in the world.

The kermes, or species known by the name of the holm-oak, is of a much lower stature than the other species of ever-green oaks; seldom growing to the height of a tree. See KERMES.

ILHEOS, or RIO DE ILHEOS, a province of Brazil in South America, subject to Portugal. It is bounded by the bay of All-saints on the north, and by the Atlantic ocean on the east.

ILIAC PASSION, in medicine, a pain in the small intestines, apt to turn to an inflammation, in which their peristaltic motion

motion is inverted, and their contents, and even the excrements themfelves, are voided by the mouth in vomiting. Nothing will pafs down, not fo much as a flatus. It is often attended with fatal fymptoms.

This difeafe, according to Hoffman, is preceded with coftivenefs, which is foon followed with moft fharp and violent pains, with an inflation, diftenfion, and a tumour of the umbilical region, which feels hard to the touch; the body is fo hard bound, that neither wind nor excrements can pafs downwards: foon after the wind firft makes its way upward, there comes on a naufea, and a frequent vomiting of a bilious and pituitous matter; the breathing grows difficult, and whatever is eaten or drank is foon thrown up again; reddifh fæces, with a ftinking fmell, are afterwards forced up by vomiting: this is fucceeded by lofs of ftrength, a preternatural heat, a hard and contracted pulfe, with great thirft: the urine is red, and is voided with difficulty. When the cafe becomes defperate, a hiccoughing and delirium appear; the nerves are diftended, the body is all in a cold fweat, and violent convulfions and fainting fits put an end to the patient.

This difeafe may proceed from a rupture, either of the fcrotum or the groin; from poifons, from any thing that ftops up the paffage thro' the fmall guts, fuch as hard, dry food, chefnuts, fea-bifcuits, quinces, pears, unripe acerb fruit, when eaten in large quantities; to which drinking little, a fedentary life, and a melancholy difpofition of mind, will greatly contribute: thefe all tend to harden the fæces: the grofs inteftines may alfo be plugged up with fcybals, efpecially if a perfon, either through fhame, or want of conveniency, does not liften to the calls of nature.

As to the cure, Sydenham thinks it neceffary firft of all to bleed in the arm, and afterwards, in an hour or two, exhibit a powerful clyfter; the fmoke of tobacco blown into the bowels through an inverted pipe, he recommends as the moft efficacious remedy: this may be repeated fome time after, unlefs the effect of the firft renders it unneceffary. If the difeafe will not yield to this, a pretty ftrong cathartic is advifeable: thus, take of the pill of fimple colocynth, half a dram; of calomel, one fcruple; and as much as is fufficient of the balfam of peru. Make the whole into four pills to be taken out of a fpoonful of fyrup of violets, taking no liquor upon them left they cannot be retained: or, take refin of fcammony, or inftead of it, refin of jalap, twelve grains; calomel, one fcruple; reduce them into powder, taking this out of a fpoonful of cow's milk: take one or two fpoonfuls of the fame milk after fwallowing them. If the patient cannot retain this, let him take twenty-five drops of the thebaic tincture in half an ounce of fpirituous cinnamon-water; and when the vomiting and pain remit, let the cathartic be repeated; and if the pain returns, give the anoydne again, and repeat it every fourth or fixth hour till the inteftines are eafy, and the cathartic begins to pafs downwards. When it has done working, give the following draught: take of fpirituous water of cinnamon, two ounces; of thebaic tincture, twenty-five drops; of which make a draught, which is to be repeated twice or thrice a day, till the vomiting and pains quite ceafe: afterwards it will be advifeable to give a paregoric, at bedtime, for feveral nights.

Hoffman advifes, after the pains are mitigated by anodynes, that a cataplafm fhould be applied to the hypogaftric region, to ftop the vomiting and hiccoughing, which may be compofed of equal parts of old venice-treacle, and expreffed oil of nutmegs, with the addition of oil of mint and camphire. This done, a gentle laxative of manna, cream of tartar, and oil of fweet almonds may be given with a more happy fuccefs, if the excrements have been long retained. When there is an inflammation, nothing is better than fix or eight grains of purified nitre, and half a grain of camphire mixed with fome antifpafmodic powder, and then taken in a convenient vehicle. Outwardly apply a liniment of axungia humana, or any other penetrating fat, and a dram of camphire.

But when other things fail in the cure of the illiac paffion, recourfe muft be had to quickfilver; half a pound or a pound at moft is fufficient, with fat broth or oil; and the patient fhould lie on his right fide, or walk gently about the room, that its defcent may be eafier; but if there is an actual inflammation, the quickfilver fhould not be ufed. Opiates may be ufed to mitigate the pain, provided they are exhibited in the beginning after bleeding, or before there is any figns of a mortification. Clyfters

are generally very advantageous, for they relax the ſpaſm of the groſs inteſtines, and for this purpoſe warm water with ſpirit of marſhmallows will be ſufficient: they ſhould be given very ſoon after the firſt attack. When the iliac paſſion proceeds from an incarcerated hernia, then Heiſter recommends bleeding as of the greateſt advantage. See HERNIA.

ILIACUS MUSCULUS, in anatomy, a broad, thick muſcle, lying on the inſide of the os ilium. It is fixed by fleſhy fibres to the internal labium of the creſt of the os ilium, to that of the ſlope between the two anterior ſpines, to the inſides of theſe ſpines, to the ſuperior half of the inſide of this bone, and to the adjacent lateral part of the os ſacrum. All theſe fibres, contracting by degrees, run obliquely towards the lower part of the muſculus pſoas, uniting with it; and being fixed by a kind of aponeuroſis to the outſide of its tendon, all the way to the little trochanter.

ILIAD, ιλιας, in literary hiſtory, the name of an antient epic poem, the firſt and fineſt of thoſe compoſed by Homer.

The poet's deſign in the iliad was to ſhew the Greeks, who were divided into ſeveral little ſtates, how much it was their intereſt to preſerve a harmony and good underſtanding among themſelves: for which end, he ſets before them the calamities that befel their anceſtors from the wrath of Achilles, and his miſunderſtanding with Agamemnon; and the advantages that afterwards accrued to them from their union. The iliad is divided into twenty-four books, or rhapſodies, which are marked with the letters of the alphabet.

The critics maintain the iliad to be the firſt, and yet the beſt epic poem that ever appeared in the world. Ariſtotle's poetics are almoſt wholly taken up about it, forming precepts from that poet's practice. Some authors tell us, that Homer invented not only poetry, but all other arts and ſciences; and that there are viſible marks of a perfect knowledge of every one of them to be ſeen in the iliad. There is a tranſlation of this noble poem into our language, by the late ingenious Mr. Pope; being, perhaps, the moſt elegant, and moſt in imitation of the original, of any attempt that way in any language whatever.

ILIUM, in anatomy, the third and laſt of the ſmall guts, is ſituated principally below the navel, near the oſſa ilii; whence its name. Its length is various: ſometimes not more than fifteen, ſometimes twenty ſpans or more. Its beginning is where the valves of the jejunum ceaſe to be conſpicuous, and its end is where the larger inteſtines begin; in which place it is, in a very ſingular manner, inſerted into the left ſide of the colon. It has no other valves except that great one at the end, which is called, by many, valvula coli Bauhini: its glands are, in general, more numerous towards the end than in any other part.

ILIUM OS. See the article INNOMINATA OSSA.

ILL, a river which riſing near Baſil, in Switzerland, runs north through Alſace, and having paſſed by Colmar, Schelſtat, and Straſburgh, falls into the Rhine a little below the laſt city.

ILLECEBRUM, in botany, a genus of the pentandria-digynia claſs of plants, having no corolla; the fruit is a capſule approaching to a roundiſh figure, but pointed at each end, formed of five valves, containing only one cell, and covered by the calyx; the ſeed is ſingle, large, roundiſh, and pointed at each end.

ILLENOIS, the inhabitants of a country contiguous to the illenois-lake, in Canada, in north America, which is ſituated between 88° and 93° of weſt long. and between 41° and 46° of north lat.

ILLER, a river of Germany, which riſing in the mountains of Tyrol, runs north through Swabia, and falls into the Danube at Ulm.

ILLEVIABLE, in law, ſignifies any debt or duty that cannot be levied.

ILLUSTRIOUS, was antiently a title of honour in the roman empire, firſt given to the moſt diſtinguiſhed among the knights who had a right to bear the latus clavis. Afterwards it was given to the firſt rank of the honorati, that is, to the præfecti prætorii, treaſurers, comites, &c. There were, however different degrees among the illuſtrious; and as in Spain there are degrees of the firſt and ſecond claſs, ſo in Rome they had their illuſtres majores and minores. The novels of Valentinian diſtinguiſh five claſſes of the illuſtrious, among whom the illuſtres adminiſtratores bore the firſt rank.

ILMEN, a lake in the province of Great Novogrod, in Ruſſia, in 34° eaſt long. and 58° north lat.

ILMINSTER, a market-town of Somerſetſhire, twenty-four miles ſouth-weſt of Wells.

ILOCK,

ILOCK, a town of Sclavonia, ſituated on the Danube, and ſubject to the houſe of Auſtria: eaſt long. 20° 32′, north lat. 45° 33′.

ILS, a river of Germany, which riſing in the mountains of Bohemia, runs ſouth and falls into the Danube at Paſſau.

ILSLEY, a market-town of Berkſhire, ten miles north-weſt of Reading.

IMAGE, in a religious ſenſe, is an artificial repreſentation or ſimilitude of ſome perſon or thing, uſed either by way of decoration and ornament, or as an object of religious worſhip and veneration; in which laſt ſenſe, it is uſed indifferently with the word idol. See IDOL.

There is no doubt but that theſe images, or idols, were at firſt of the plaineſt and moſt ſimple materials and as in the early ages people had but little ſkill in ſculpture, it is probable that they made choice of ſuch materials as were moſt eaſily wrought and faſhioned into the intended figure; from hence it is not unlikely that the firſt images were made of earth, and that to give them ſome beauty, they were painted with different colours. Thus Pliny tells us, that Tarquinius Priſcus cauſed a ſtatue of Jupiter Capitolinus to be made of earth and painted red. Next to earth, wood ſeems to have been the moſt common material for images; but in length of time they were made of braſs, ſilver, and gold. For the worſhip of images, ſee the articles GOD and IDOLATRY.

The worſhip of images among the chriſtians, occaſioned great conteſts both in the eaſtern and weſtern churches; but at length this worſhip, in ſpight of all oppoſition made againſt it, was allowed and enjoined.

The roman catholics boaſt of the miraculous effects of the images of their ſaints. The image of Jeſus Chriſt, which feeling itſelf wounded with a dagger by an impious wretch, laid its hand upon the wound, is famous at Naples. It is pretended that the image of St. Catharine of Sienna, has often driven out devils, and wrought other miracles: and that the lady of Lucca, when inſolently aſſaulted by a ſoldier, who threw a ſtone at her, and had like to have broken the head of the child Jeſus, whom ſhe held on her right arm, immediately ſet him on her left, and the child liked ſitting on that arm ſo well, that ſince that accident, he has never changed his ſituation.

As to the greek church, tho' they reject the uſe of graven images and ſtatues, they pay a boundleſs veneration to pictures, and upon ſolemn feſtivals plant the picture of the ſaint to whom the church is dedicated in the center of the church; and every perſon preſent ſalutes it not by kneeling or proſtration, but by giving it a kiſs. If the picture repreſents our bleſſed Lord, they kiſs its feet; if the virgin Mary, its hands; but if it be any other ſaint, they approach it with more familiarity, and kiſs its cheek. Before theſe pictures they alſo addreſs their prayers.

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of ſenſe.

Lord Bacon, having divided the doctrine of the mental faculties into logics and ethics, conſiders the imagination as performing the office of an agent or embaſſador on both ſides, and aſſiſting alike in the judicial and miniſterial capacity. Senſe, according to him, commits all ſorts of notions to the imagination, and reaſon afterwards judges of them. In like manner, reaſon tranſmits ſelect and approved notions to the imagination before the decree is executed; for imagination always precedes and excites voluntary motion, and is therefore a common inſtrument both to the reaſon and the will; only it has two faces, that turned towards reaſon bearing the effigy of truth, but that towards action, the effigy of goodneſs, yet ſo as to appear the effigies of ſiſters.

Mr. Boyle ſays, that there are many inſtances in phyſical-books of diſeaſes ariſing from imagination, particularly where the diſeaſe is exceſſively dreaded; adding, that he knew a lady who had the ſmall-pox by this means: nor is it only in women that imagination has theſe effects, for he tells us of a man whoſe hair was ſuddenly changed from a fear of his going to be put to death. The remembrance of a lothſome potion will often produce a horror, attended with a ſenſible commotion of the whole body, and a kind of convulſion about the ſtomach. Shame, we ſee, occaſions the blood to be plentifully thrown up into the face, as will alſo great and ſudden joy. Longing in women may be ſuppoſed to create great alterations in the body of the mother, ſince it will leave ſuch laſting

and

and ſtrong impreſſions upon that of the infant. And Mr. Boyle tells us of a young lady who waſhing in St. Winifred's well, and fixing her eyes very attively upon the red pebble-ſtones which in a ſcattered order made a large part of thoſe that appeared through the water, a while afterwards grew big, went her time, and was delivered of a child, whoſe ſkin was plentifully ſpeckled with ſpots of the colour and magnitude of theſe ſtones. We have had lately an ingenious poem, in Engliſh, upon the pleaſures of the imagination; and Addiſon's eſſays upon that ſubject in the Spectator, as well as Hutchinſon's treatiſe on beauty and virtue, deſerve the attention of ſuch as deſire to be informed in this branch of philoſophy.

IMAM, a name applied by the mahometans to him who is head of the congregations in their moſques; and by way of eminence to him who has the ſupreme authority both in reſpect to ſpirituals and temporals.

There are ſubordinate imams in each town who repreſent the chief imam, but only with reſpect to religion. When the imam of the muſſulman religion is mentioned without diſtinction, it is always reſtricted to the rightful and lawful ſucceſſor of Mahomet, the fountain both of ſecular and ſacred juriſdiction. The mahometans are not perfectly agreed concerning the dignity of ſome of the circumſtances of this office: ſome hold the imamate to be ſettled by divine right, like the aaronical prieſthood, in one family: others think it not ſo unalterably tied to genealogy and deſcent, as to hinder its paſſing from one family to another; and they ſay that an imam may be depoſed for vicious conduct, and his office conferred to another.

The ſchiites, or diſciples of Ali, maintain, that this privilege belongs to the family of Ali excluſive of all others; Ali being ſole heir to Mahomet: hence, they own no perſon for the head of religion, who cannot prove his deſcent in a right line from this firſt imam. There are imams belonging to particular moſques, who are in the nature of our pariſh-prieſts.

IMBARGO, or EMBARGO, in naval affairs. See the article EMBARGO.

IMBECILITY, a languid, infirm ſtate of body, which, being greatly impaired, is not able to perform it uſual exerciſes and functions.

IMBEZLE, ſignifies to ſteal, pilfer, or purloin, and alſo to waſte or diminiſh goods, &c. entruſted to a perſon's charge and care. Imbezlers of wool forfeit double damages, and may be committed to the houſe of correction till paid; and ſervants embezling their maſter's goods to the value of 40 s are deemed guilty of felony without benefit of clergy.

IMBIBING, the action of a dry porous body, that abſorbs or takes up a moiſt or fluid one: thus, ſugar imbibes water; a ſpunge, the moiſture of the air, &c.

IMBRICATED, among botaniſts, an appellation given to ſuch leaves of plants, as are placed over one another like the tiles of a houſe.

The term imbricated is likewiſe applied to ſome of the heart-ſhells, from their being rigid tranſverſely in the ſame manner.

IMENSTAT, a town of Germany, in the circle of Swabia, ſituated in eaſt long. 10° 8′, north lat. 47° 25′.

IMITATION, in literary matters, the act of doing or ſtriving to copy after, or become like to, another perſon or thing.

Du Bos obſerves, that the principal merit of poems and pictures, conſiſts in the imitation of ſuch objects as would have excited real paſſions; and that the paſſions which theſe imitations give riſe to, are only ſuperficial, and not ſo ſtrong as that of the object imitated, and are therefore ſoon effaced. He alſo maintains, that the imitation of tragic objects in poems and pictures, afford moſt pleaſure; we liſten, therefore, with pleaſure to thoſe unhappy men who make a recital of their misfortunes by means of a painter's pencil, or of a poet's verſes; but, as Diogenes Laertius obſerves, it would afflict us extremely, were we to hear them bewailing their ſad diſaſters in perſon. The too great impreſſions theſe imitations make upon man, was the reaſon of Plato's excluding them from his republic. Poets and painters cannot chooſe too engaging a ſubject for their imitation, ſince the principal charm of theſe two arts, as Du Bos obſerves, proceeds from the imitation of objects capable of engaging us.

Imitation, ſays he, ought not to be ſervile, but like that which Horace, Virgil, and many other good writers made uſe of, who preceded them; that is, by following the genius of the language in which they compoſed, and taking nature for their firſt model.

IMITATION, in muſic, a particular way of compoſition wherein each part is made

to imitate the other, either throughout the whole piece, which is one of the kinds of canon; or only during some measures, which is a simple imitation.

Sometimes the motion or figure of the notes is only imitated, and that often by a contrary motion, which makes what they call a retrograde imitation.

Imitation differs from a fugue, says Mr. Brossard, in regard in the former the repetition must be a second, third, sixth, seventh, or ninth, either above or below the first voice or guide; to which it may be added, that it may be at any interval, and differs properly from fugue, in that in imitation the intervals may not be precisely the same; whereas were the repetition to an unison, fourth, fifth, or octave, higher or lower, and the intervals exactly the same in the comes and guido, it would be a fugue.

IMMACULATE, something without stain, chiefly applied to the conception of the holy virgin. See CONCEPTION.

IMMANENT, in logic. The schoolmen distinguish two kinds of actions, the one transient, which pass from the agent to the patient, the other immanent, which continue in the agent. See ACT.

IMMATERIAL, something devoid of matter, or that is pure spirit: thus God, angels, and the human soul are immaterial beings. See the articles GOD, ANGEL, and SOUL.

IMMEDIATE, whatever is capable of producing an effect without the intervention of external means; thus we say, an immediate cause, in opposition to a mediate or remote one. See CAUSE.

IMMEDIATE MODE. See MODE.

IMMEMORIAL, in law, an epithet given to the time or duration of any thing, whose beginning we know nothing of.

In a legal sense, a thing is said to be of time immemorial, or time out of mind, that was before the reign of king Edw. II.

IMMENSITY, an unlimited extension, or which no finite and determinate space, repeated ever so often, can equal.

IMMERETTA, a province of Asiatic Turky, situated between Georgia and the Euxine sea.

IMMERSION, that act by which any thing is plunged into water, or other fluid. See the article FLUID.

It is used in chemistry for a species of calcination, when any body is immersed in a fluid to be corroded; or it is a species of lotion, as when a substance is plunged into any fluid in order to deprive it of a bad quality, or communicate to it a good one.

IMMERSION, in astronomy, is when a star or planet is so near the sun with regard to our observations, that we cannot see it; being, as it were, enveloped and hid in the rays of that luminary. It also denotes the beginning of an eclipse of the moon, or that moment when the moon begins to be darkened, and to enter into the shadow of the earth; and the same term is also used with regard to an eclipse of the sun, when the disk of the moon begins to cover it. In this sense emersion stands opposed to immersion, and signifies the moment wherein the moon begins to come out of the shadow of the earth, or the sun begins to shew the parts of his disk which were hid before. See the article ECLIPSE.

Immersion is frequently applied to the satellites of Jupiter, and especially to the first satellite; the observation whereof is of so much use for discovering the longitude. The immersion of that satellite is the moment in which it appears to enter within the disk of jupiter, and its emersion the moment when it appears to come out.

The immersions are observed from the time of the conjunction of jupiter with the sun, to the time of his opposition; and the emersions from the time of his opposition to his conjunction.

The peculiar advantage of these observations is, that during eleven months of the year, they may be made at least every other day. The perfection of this theory and the praxis thereon, we owe to Mr. Cassini.

IMMORTAL, that which will last to all eternity; as having in it no principle of alteration or corruption: thus God and the human soul are immortal. See the articles GOD and SOUL.

IMMUNITY, a privilege or exemption from some office, duty, or imposition, as an exemption from tolls, &c.

Immunity is more particularly understood of the liberties granted to cities and communities.

IMMUTABILITY, one of the divine attributes, founded on the absolute perfection of the deity. See GOD.

The immutability of God is two-fold, physical and moral. The first consists in this, that the divine essence does not, nor possibly can, receive any alteration; and the moral immutability is founded on the perfection of his nature, whereby

he always wills the same things, or such as are best on the whole.

IMOLA, a city of Italy, seventeen miles east of Bologna, subject to the pope.

IMPALED, in heraldry; when the coats of a man and his wife who is not an heiress are borne in the same escutcheon, they must be marshalled in pale; the husband's on the right side, and the wife's on the left: and this the heralds call baron and feme, two coats impaled.

If a man has had two wives, he may impale his coat in the middle between theirs; and if he has had more than two, they are to be marshalled on each side of his in their proper order.

IMPALPABLE, that whose parts are so extremely minute that they cannot be distinguished by the senses, particularly by that of feeling.

IMPANATION, a term used by divines, to signify the opinion of the lutherans with regard to the eucharist, who believe that the species of bread and wine remain together with the body of our Saviour after consecration.

IMPANELLING, in law, signifies the writing down or entering into a parchment, list or schedule, the names of a jury summoned by the sheriff to appear for such public services as juries are employed in. See the article PANNEL.

IMPARLANCE, in law, a petition in court for a day to consider or advise what answer the defendant shall make to the plaintiff's action; and is the continuance of the cause till another day, or a longer time given by the court.

An imparlance is general or special; general is when it is entered in general terms, without any special clause therein; special is where the defendant desires a further day to answer. And this last imparlance is of use to plead some matters, which cannot be pleaded after a general imparlance.

It is said that imparlance was formerly from day to day, but now it is from one term to another. In case the plaintiff amends his declaration after the same is delivered or filed, the defendant may in course imparl to the next term afterwards, unless the plaintiff pays costs; but if he does, and they are accepted, the defendant may not have an imparlance. Likewise the not delivering a declaration in time, is sometimes the cause of imparlance; and when the plaintiff declares, yet does not proceed in three terms after, in such case the defendant may imparl to the next succeeding term. But there are divers cases wherein imparlances are not to be given, as where a person is sued by an attorney or any other privileged person of the court in an assize, one may not imparl except good cause be given, nor shall there be imparlance in action of special clausum fregit, *&c.*

IMPARSONNEE, or parson imparsonee, in law. See the article PARSON.

IMPASSIBLE, that which is exempt from suffering, or cannot undergo pain or alteration.

The stoics place the soul of their wise man in an impassible, or imperturbable state. See the article STOICS.

IMPASTATION, the mixtion of various materials of different colours and consistencies, baked or bound together with some cement, and hardened either by the air or by fire.

IMPASTATION, in masonry, a term used for a work made of stuc, or stone, beaten and wrought up in manner of a paste.

Some authors are of opinion, that the obelisks and the huge antique columns still remaining, were made by impastation.

IMPASTING, or EMPASTING, in painting. See the article EMPASTING.

IMPATIENS, TOUCH-ME-NOT, in botany, a genus of plants otherwise called balsamina. See BALSAMINA.

This plant is said to be so strong a diuretic, as to bring on a diabetes.

IMPEACHMENT, an accusation and prosecution for treason and other crimes and misdemeanors. Any member of the lower house of parliament may impeach any one belonging either to that body, or to the house of lords. The method of proeeeding, is to exhibit articles on the behalf of the commons, by whom managers are appointed to make good their charge. These articles are carried to the lords, by whom every person impeached by the commons is always tried; and if they find him guilty no pardon under the great seal can be pleaded to such an impeachment. 12 Will. III. cap. ii.

IMPEACHMENT *of waste*, is a prohibition or restraint from committing of waste upon lands or tenements. This term also signifies a demand of satisfaction for waste committed by a tenant, who has only a particular estate in the land granted, as for life or years. Yet a person that holds lands on lease containing this clause, *viz.* to hold without impeachment of waste, has

has thereby fuch an intereft in the lands, &c. that he may commit wafte without being impeached or queftioned for it.

IMPEDIMENTS, in law, are fuch hindrances as put a ftop, or ftay, to a perfon's feeking for his right by due courfe of law.

Perfons under impediments are thofe that are either under age, or under cover, that are non compos mentis, in prifon, beyond fea, &c. who by our ftatutes are allowed time to claim and profecute their rights, after fuch impediments are removed, efpecially in cafe of fines levied.

IMPENETRABILITY, in philofophy, that property of body, whereby it cannot be pierced by another: thus, a body, which fo fills a fpace as to exclude all others, it is faid to be impenetrable. See the articles BODY, EXTENSION, &c.

IMPERATIVE, one of the moods of a verb, ufed when we would command, entreat or advife: thus, *go, read, take pity, be advifed,* are imperatives in our language; but in the learned languages, this mood has a peculiar termination to diftinguifh it from others, as *i,* or *ito, go*; *lege,* or *legito, read,* &c. and not only fo, but the termination varies, according as you addrefs one or more perfons, as *audi* and *audite*; *ακυέτω, ακυέτων, ακυέτωσαν,* &c.

IMPERATOR, in roman antiquity, a title of honour conferred on victorious generals, by their armies, and afterwards confirmed by the fenate.

IMPERATORIA, MASTER-WORT, in botany, a genus of the pentandria-digynia clafs of plants, the general corolla of which is uniform; the fingle flowers are compofed each of five inflexo-cordate and nearly equal petals; the fruit is naked, round, compreffed, and feparable into two parts; the feeds are two, oval, furrowed with two lines on one fide, and furrounded with a broad margin.

The root of this plant is cordial and fudorific, and is an ingredient in many compofitions.

IMPERFECT, fomething that is defective, or that wants fome of the properties found in other beings of the fame kind: thus moffes are called imperfect plants, becaufe almoft all the parts of fructification are wanting in them; and for the like reafon, is the appellation imperfect given to the fungi and fubmarine plants. See the articles MOSS and FUNGUS.

IMPERFECT FLOWERS, thofe otherwife called ftamineous. See the article STAMINEOUS.

IMPERFECT NUMBERS, fuch whofe aliquot parts taken together, do either exceed or fall fhort of that whole number of which they are parts: they are either abundant or deficient. See the articles ABUNDANT and DEFICIENT.

IMPERFECT TENSE, in grammar, a tenfe that regards fome præterite tenfe, or denotes the thing to be at that time prefent, and not quite finifhed; as *fcribebam, I was writing.*

IMPERIAL, fomething belonging to an emperor or empire, as imperial crown, imperial chamber, imperial cities, imperial diet, &c. See CROWN, CHAMBER, CITY, DIET, &c.

IMPERIAL is alfo a city and port-town of the province of Chili, in South America, fituated in weft longitude 80°, north latitude 39°.

IMPERSONAL VERB, in grammar, a verb to which the nominative of any certain perfon cannot be prefixed; or, as others define it, a verb deftitute of the two firft and primary perfons, as *decet, oportet,* &c. The impersonal verbs of the active voice end in *t,* and thofe of the paffive in *tur*; they are conjugated thro' the third perfon fingular of almoft all the tenfes and moods: they want the imperative, inftead of which we ufe the prefent of the fubjunctive; as *pæniteat, pugnetur*; nor, but a few excepted, are they to be met with in the fupines, participles, or gerunds.

IMPERVIOUS, a thing not to be pervaded, nor paffed through, either by reafon of the clofenefs of its pores, or the particular configuration of its parts.

IMPETIGO, in medicine, a name by which the leprofy of the Greeks is fometimes called. See LEPROSY.

IMPETIGO is alfo a fpecies of itch, attended with dry fcales or fcurf, and an uneafy pruriginous itching. See ITCH.

IMPETRATION, in law, the obtaining any thing by requeft or prayer: but in our old ftatutes, it is taken for the preobtaining of church benefices in this realm, from the court of Rome, which lie in the difpofition and gift of the king and other lay-patrons of this land.

IMPETUS, in mechanics, the force with which one body impels or ftrikes another. See the articles MOMENTUM, GUNNERY, &c.

IMPING, in falconry, the inferting of a feather

feather in the wing of an hawk, in the place of one that is broken.

IMPLANTATION, the same with transplantation. See TRANSPLANTATION.

IMPLEAD signifies to sue or prosecute by due course of law.

IMPLEMENTS is used for all things necessary for a trade, or the furniture of an houshold; in which sense, it is frequently used in wills, conveyances of moveables, &c.

IMPLICITE, something tacitly comprised or understood; that is, contained in a discourse, clause, or proposition, not in express terms, but only by induction and consequence.

IMPLICATION, in law, is where something is implied, that is not expressed by the parties themselves in their deeds, contracts, and agreements.

In this case, the want of words may be supplied by implication. Thus, where a husband by will devises all the goods in his house, to his wife; and after her decease, bequeaths his house and those goods to his son, it is implied, in law, that the widow is to have the house for life; because though the son might have had it, he is not mentioned by will to have any thing till after the decease of the mother. But it is otherwise, where a person devises part of his lands to his wife for life, and the part so devised, with all the rest of his lands to the youngest son, and his heirs, after the wife's decease: in this case, as there is no express devise of the rest of the lands to the wife, she cannot have them by implication; for since the eldest son, who is heir at law, is not excluded, he shall have them during his mother's life, and till the devise to the youngest son takes effect.

IMPORTATION, in commerce, the bringing merchandize into a kingdom from foreign countries; in contradistinction to exportation. See EXPORTATION.

We shall here give some of the principal laws relating to the importation of goods into this kingdom. Goods imported without entry, or paying customs, are forfeited; and the lord-treasurer, the barons of the exchequer, or chief magistrates of the place where the offence was committed, or next adjoining to it, may grant a warrant to any person, who, with the assistance of a constable, may break open doors, chests, &c. and take thence any prohibited or unaccustomed goods; but this is to be done, within one month after the offence was committed. But if false information is given, the person wrongfully accused, may recover costs and damages. See the article DUTY.

No ship or vessel arriving from beyond sea is to be above three days in sailing from Gravesend to the place of discharge on the river Thames, unless hindered by contrary winds or other impediment. And no ship bound for the port of London is to touch or stay at any place adjoining to any shore, between Gravesend and Chester-quay. True entries are to be made of all such ships lading, upon oath of the master or purser for that voyage; also where she took in her lading, where she was built, how manned, who were the owners, and who the master during the voyage. In all out-ports, ships are to come directly to the place of unlading, and make true entries as aforesaid, upon penalty of the forfeiture of 100 l.

After any ship is cleared, and the watchmen and tidesmen discharged from their attendance, if there be found on board any concealed goods that have not paid the duty inwards, the master, or other person taking charge of the ship, shall forfeit 100 l.

Porters, carmen, watermen, &c. assisting in landing unaccustomed goods, shall, on conviction, for the first offence, be committed to the next jail till they find security for their good behaviour; and for their second offence, they are to be committed to prison for two months, without bail or mainprize, or till they are discharged by the court of exchequer, or each of them pay 5 l. to the sheriff of the county.

No merchant-denizen shall cover a stranger's goods, but shall, by himself or agent, sign one of his bills of every entry, with the mark, number, and contents of every parcel of goods, without which no entry shall pass. And no children of aliens under the age of twenty-one years, shall have entry made in their names, nor be admitted to trade.

Merchants, trading into the port of London, shall have free liberty to lade and unlade their goods at any of the lawful quays between the Tower and London-bridge, from sun-rising to sun-setting, from September 10, to March 10; and between six o'clock in the morning and six in the evening, from March 10, to September 10; giving notice thereof to the respective officers, appointed to attend the lading and unlading of goods. And

ſuch officers as ſhall refuſe to be preſent, ſhall forfeit 5l. for every default.

To prevent combination between importers, and ſeizers of goods unlawfully imported or exported, none ſhall ſeize them but the officers of the cuſtoms, or ſuch as ſhall be authoriſed ſo to do by the lord treaſurer, under treaſurer, or a ſpecial commiſſion from his majeſty, under the great or privy ſeal.

If any ſeizer of prohibited or unaccuſtomed goods does not make due proſecution thereof, it is lawful for the cuſtom-houſe officers, or others deputed thereto, to make ſeizure of ſuch goods, and they ſhall be, in law, adjudged the firſt true informers and ſeizers, and have the benefit thereof, notwithſtanding any law and ſtatute to the contrary.

All foreign goods permitted to be landed by bills at ſight, bills at view or ſuffrance, ſhall be landed at the moſt convenient quays and wharfs, as the officers of the cuſtoms ſhall direct; and there, or at the king's ſtorehouſe of the reſpective ports, ſhall be meaſured, weighed, numbered, *&c.* by the officers appointed, who ſhall perfect the entry, and ſubſcribe their names to it, and the next day make their report to the cuſtomer, collector, or comptroller; or in default thereof, ſhall forfeit 100l.

Any merchant who ſhall import goods, ſhall have liberty to break bulk in any lawful port or quay, the maſter or purſer firſt making oath of the true contents of the ſhip's lading. No engliſh merchant ſhall put on ſhore in Scotland or Ireland, any merchandize of the growth or produce of any of his majeſty's plantations, unleſs the ſame have been firſt landed in England, Wales, or Berwick, and paid the duties with which they are chargeable, under the penalty of forfeiting the ſhip and goods, three fourths to the king, and one fourth to the informer, or he that ſhall ſue for the ſame: but if a ſhip be diſabled, or driven into any port of Ireland, and unable to proceed on her voyage, her goods may be put on ſhore, under the hands of the principal officers of the cuſtoms there reſiding, till the goods can be put on board ſome other veſſel, to be tranſported to ſome part of England or Wales.

Natives of England or Ireland may import into England, directly from Ireland, any hemp, flax, thread, yarn, and linen, of the growth and manufacture of Ireland, cuſtom-free; the chief officer ſo importing bringing a certificate from the chief office in Ireland, expreſſing the particulars of the goods, with the names and places of abode of the exporters thence, and of ſuch as have ſworn that the ſaid goods are, bona fide, of the growth and manufacture of that kingdom, and who they are conſigned to in England; and the chief officers ſhall make oath, that the ſaid goods are the ſame that are on board, by virtue of that certificate.

IMPOSITION *of hands*, a religious ceremony, in which a biſhop lays his hand upon the head of a perſon, in ordination, confirmation, or in uttering a bleſſing. This practice is alſo generally obſerved by the diſſenters at the ordination of their miniſters, when all the miniſters preſent place their hands upon the head of him whom they are ordaining, while one of the body prays for a bleſſing on him and his future labours.

Impoſition of hands was a jewiſh ceremony, introduced not by any divine authority, but by cuſtom; it being the practice of thoſe people, whenever they prayed for any perſon, to lay their hands on his head. Our Saviour obſerved the ſame ceremony both when he conferred his bleſſing on the children, and when he cured the ſick: the apoſtles alſo laid hands on thoſe, upon whom they conferred the Holy Ghoſt. In the antient church, impoſition of hands was even practiſed in marriage, which cuſtom is ſtill obſerved by the Abyſſinians.

However, the uſe of this term, which in its original ſignification was general, is now reſtrained, by cuſtom, to the laying on of hands practiſed in ordination.

IMPOSSIBLE, that which cannot be done or effected.

A propoſition is ſaid to be impoſſible, when it contains two ideas, which mutually deſtroy each other, and which can neither be conceived nor united together in the mind: thus, it is impoſſible, that a circle ſhould be a ſquare, becauſe we conceive clearly that ſquareneſs and roundneſs deſtroy each other by the contrariety of their figure.

Impoſſibilities are of three kinds, *viz.* metaphyſical, phyſical, and moral. A thing is metaphyſically impoſſible, when it cannot be done even by divine power; as that a ſquare ſhould be round, *&c.* thoſe ideas, as was already obſerved, deſtroy each other, imply a contradiction, and are, ſtrictly ſpeaking, nothing at all, in regard that what is affirmed, is at the

ſame

ſame time denied: this impoſſibility is otherwiſe termed abſolutely impoſſible.

A thing is ſaid to be phyſically impoſſible, that cannot be done by any natural powers, as the reſurrection of the dead: this is otherwiſe termed *impoſſibile creaturæ*, or impoſſible with regard to the creature.

A thing is morally impoſſible, when, of its own nature, it is poſſible; but yet is attended with ſuch difficulties, as that, all things conſidered, it appears impoſſible: thus, it is morally impoſſible that all men ſhould be virtuous, or that a man ſhould throw the ſame number with three dice an hundred times ſucceſſively.

But with greater propriety a thing is ſaid to be morally impoſſible, when it is repugnant to good ſenſe and decency, or contrary to the laws of nature: thus the lawyers ſay, *omne turpe eſt impoſſibile:* theſe conditions are impoſſible, therefore, which ſenſe and decorum do not allow to be performed, though in themſelves very poſſible to thoſe who have no regard to good ſenſe, *&c.*

IMPOST, in law, ſignifies in general a tribute or cuſtom, but is more particularly applied to ſignify that tax which the crown receives for merchandizes imported into any port or haven. See DUTY.

Some, notwithſtanding, diſtinguiſh impoſts from cuſtoms, which laſt are rather the profits ariſing to the king from goods exported. See the article CUSTOMS.

IMPOSTS, in architecture, the capitals of pillars, or pilaſters, which ſupport arches.

An impoſt, ſometimes called chaptrel, is a ſort of a plinth, or little corniche, which crowns a pier, and ſupports the firſt ſtone whence an arch or vault commences. The impoſts are conformable to their proper orders. The tuſcan has only a plinth; the doric has two faces crowned; the ionic, a larmier, or crown over the two faces, and its mouldings may be carved; the corinthian and compoſite have a larmier, frieze, and other mouldings. See the articles TUSCAN, DORIC, *&c.*

The projectures of the impoſts muſt not exceed the naked of the pilaſter: ſometimes the entablature of the order ſerves for the impoſt of the arch, and this has a very grand and ſtately appearance.

The impoſt is a thing very eſſential to the compoſition of the ordonnance, inſomuch that without it, in the place where the curve line of the arch meets with the perpendicular line of the pillar, there always ſeems a kind of elbow.

IMPOSTHUME, in ſurgery, *&c.* the ſame with abſceſs. See ABSCESS.

IMPOTENCE, or IMPOTENCY, in general, denotes want of ſtrength, power, or means to perform any thing.

Divines and philoſophers diſtinguiſh two ſorts of impotency, natural and moral; the firſt is a want of ſome phyſical principle, neceſſary to an action; or where a being is abſolutely defective, or not free and at liberty to act: the ſecond only imports a great difficulty, as a ſtrong habit to the contrary, a violent paſſion, or the like.

Impotency is, more particularly, uſed for a natural inability to coition. Impotence with reſpect to men, is the ſame as ſterility in women; that is, an inability of propagating the ſpecies. There are many cauſes of impotence, as a natural defect in the organs of generation, which ſeldom admits of a cure: accidents, diſeaſes; and in ſuch caſes the impotence may, or may not be remedied, according as theſe are curable or otherwiſe. But there is reaſon to believe that the moſt frequent cauſes of impotence are prepoſterous methods of venery, and too often repeated venereal injuries. See the article GONORRHOEA.

Dr. James thinks that a ſudden impotence happening to a man not accuſtomed to any diſorders of that kind, and not accountable for from any preceding accidents, is a fore-runner of ſome great diſorder; and that, in ſuch caſes, provocatives are very dangerous, becauſe it is poſſible they may increaſe the diſorder which cauſes the impotence, and make it fatal. Hippocrates adviſes a man who has a mind to get children, not to get drunk, nor drink white-wine, but that which is ſtrong and unmixed, nor to uſe the warm bath.

Another principal cauſe of impotence is the vicious habit of drinking ſpirits, that is, drams and the like.

IMPRACTICABLE CASE, in algebra, that otherwiſe called irreducible. See the article IRREDUCIBLE CASE.

IMPRECATION, a curſe, or wiſh that evil may befal any one. See the article EXECRATION.

IMPREGNATION, the getting a woman with-child. See PREGNANCY.

The term impregnation is alſo uſed, in pharmacy, for communicating the virtues

virtues of one medicine to another, whether by mixture, coction, digestion, *&c.*

IMPRESSION is applied to the species of objects, which are supposed to make some mark or impression on the senses, the mind, and the memory.

The peripatetics assert, that bodies emit species resembling them, which are conveyed to the common sensorium, and there are rendered intelligible by the active intellect; and when thus spiritualized, are called expressions, or express species, as being expressed from the others.

IMPRESSION also denotes the edition of a book, regarding the mechanical part only; whereas edition, besides this, takes in the care of the editor, who corrected or augmented the copy, adding notes, *&c.* to render the work more useful. See the article EDITOR.

IMPREST, *Auditors of.* See AUDITOR.

IMPREST-MONEY, the money paid at the enlisting of soldiers.

IMPRISONMENT, the state of a person restrained of his liberty, and detained under the custody of another.

No person is to be imprisoned but as the law directs, either by the command or order of a court of record, or by lawful warrant; or the king's process, on which one may be lawfully detained. And at common law, a person could not be imprisoned unless he were guilty of some force and violence, for which his body was subject to imprisonment, as one of the highest executions. Where the law gives power to imprison, in such case it is justifiable, provided he that does it in pursuance of a statute, exactly pursues the statute in the manner of doing it, for otherwise it will be deemed false imprisonment, and of consequence it is unjustifiable. Every warrant of commitment for imprisoning a person, ought to run, "Till delivered by due course of law," and not "Until farther order;" which has been held ill, and thus it also is, where one is imprisoned on a warrant not mentioning any cause for which he is committed.

A person being sent to prison by a warrant from a secretary of state, without assigning any cause, *&c.* it was adjudged, that he ought to be discharged for that reason. Persons may also, by bail or habeas corpus, be discharged from their imprisonment in any case bailable. See the articles HABEAS CORPUS, BAIL, PRISON, and PRISONER.

IMPROPER FRACTIONS, in arithmetic. See the article FRACTION.

IMPROPRIATION, a parsonage or ecclesiastical living, the profits of which are in the hands of a layman; in which sense, it stands distinguished from appropriation, which is where the profits of a benefice are in the hands of a bishop, college, *&c.* though these terms are now often used promiscuously. See the article APPROPRIATION.

IMPULSE, or IMPULSIVE FORCE, in mechanics, the same with impetus. See the article IMPETUS.

IMPURITY, in the law of Moses, is any legal defilement. Of these there were several sorts; some were voluntary, as the touching a dead body, or any animal that died of itself, or any creature that was esteemed unclean; or the touching things holy, by one who was not clean, or was not a priest; the touching one who had a leprosy, one who had a gonorrhœa, or who was polluted by a dead carcase, *&c.* Sometimes these impurities were involuntary, as when any one inadvertently touched bones, or a sepulchre, or any thing polluted; or fell into such diseases as pollute, as the leprosy, *&c.*

The beds, cloaths, and moveables which had touched any thing unclean, contracted also a kind of impurity, and in some cases communicated it to others. These legal pollutions were generally removed by bathing, and lasted no longer than the evening. The person polluted plunged over head in the water, and either had his cloaths on when he did so, or washed himself and his cloaths separately. Other pollutions continued seven days, as that which was contracted by touching a dead body. That of women in their monthly courses lasted till this was over with them. Other impurities lasted forty or fifty days, as that of women who were lately delivered, who were unclean forty days after the birth of a boy, and fifty after the birth of a girl. Others again lasted till the person was cured. Many of these pollutions were expiated by sacrifices; and others by a certain water or lye, made with the ashes of a red heifer, sacrificed on the great day of expiation. When the leper was cured, he went to the temple, and offered a sacrifice of two birds, one of which was killed, and the other set at liberty. He who had touched a dead body, or had been present at a funeral, was to be purified

rified with the water of expiation, and this upon pain of death. The woman who had been delivered, offered a turtle and a lamb for her expiation; or if ſhe was poor, two turtles or two young pigeons.

Theſe impurities, which the law of Moſes has expreſſed with the greateſt accuracy and care, were only figures of other more important impurities, ſuch as the ſins and iniquities committed againſt God, or faults committed againſt our neighbour. The ſaints and prophets of the Old Teſtament were ſenſible of this; and our Saviour, in the goſpel, has ſtrongly inculcated, that they are not outward and corporeal pollutions which render us unacceptable to God, but ſuch inward pollutions as infect the ſoul, and are violaations of juſtice, truth, and charity.

IMPUTATION, in general, the charging ſomething to the account of one, which belonged to another: thus, the aſſertors of original ſin maintain, that Adam's ſin is imputed to all his poſterity. See the article ORIGINAL SIN.

In the ſame ſenſe, the righteouſneſs and merits of Chriſt are imputed to true believers.

INACCESSIBLE, ſomething that cannot be come at, or approached, by reaſon of intervening obſtacles, as a river, rock, &c. It is chiefly uſed in ſpeaking of heights and diſtances. See the articles HEIGHT and DISTANCE.

INACTIVITY *of matter*. See INERTIA.

INADEQUATE IDEA. See IDEA.

INALIENABLE, that which cannot be legally alienated or made over to another: thus the dominions of the king, the revenues of the church, the eſtates of a minor, &c. are inalienable, otherwiſe than with a reſerve of the right of redemption.

INAMBLUCIÆ, in natural hiſtory, a genus of ſelenitæ, of a columnar, abrupt, and ſeemingly fibroſe texture. See the article SELENITÆ.

There are only two known ſpecies of this genus, *viz.* the inamblucia, with very fine filaments, and that with whitiſh and black filaments.

INAMELLING, or ENAMELLING. See the article ENAMELLING.

INANIMATE, a body that has either loſt its ſoul, or that is not of a nature capable of having any.

INANITION, among phyſicians, denotes the ſtate of the ſtomach when empty, in oppoſition to repletion.

INARCHING, in gardening, is a method of grafting, commonly called grafting by approach, and is uſed when the ſtock intended to graft on, and the tree from which the graft is to be taken, ſtand ſo near, or can be brought ſo near, that they may be joined together. The method of performing it, is as follows: take the branch you would inarch, and having fitted it to that part of the ſtock where you intend to join it, pare away the rind and wood on one ſide, about three inches in length. After the ſame manner cut the ſtock or branch in the place where the graft is to be united, ſo that the rind of both may join equally together; then cut a little tongue upwards in the graft, and make a notch in the ſtock to admit it; ſo that when they are joined, the tongue will prevent their ſlipping, and the graft will more cloſely unite with the ſtock. Having thus placed them exactly together, tie them with ſome baſs, or other ſoft tying; then cover the place with grafting clay, to prevent the air from entering to dry the wound, or the wet from getting in to rot the ſtock: you ſhould alſo fix a ſtake in the ground, to which that part of the ſtock, together with the graft, ſhould be faſtened, to prevent the wind from breaking them aſunder, which is often the caſe, when this precaution is not obſerved. In this manner they are to remain about four months, in which time they will be ſufficiently united, and the graft may then be cut from the mother tree, obſerving to ſlope it off cloſe to the ſtock; and if at this time you cover the joined parts with freſh grafting-clay, it will be of great ſervice to the graft.

This operation is always performed in April or May, and is commonly practiſed upon myrtles, jaſmines, walnuts, firs, pines, and ſeveral other trees that will not ſucceed by common grafting, or budding.

INAUGURATION, the coronation of an emperor or king, or the conſecration of a prelate; ſo called from the ceremonies uſed by the Romans, when they were received into the college of augurs. See CORONATION, CONSECRATION, &c.

INCA, or YNCA, a name given by the natives of Peru to their kings, and the princes of the blood. Pedro de Cieça, in his Chronicle of Peru, gives the origin of the incas, and ſays, that that country was, for a long time, the theatre of all manner of crimes, of war, diſſention, and the moſt dreadful diſorders, till at laſt

laſt two brothers appeared, one of whom was called Mangocapa; of this perſon, the Peruvians relate many wonderful ſtories. He built the city of Cuſco, made laws, eſtabliſhed order and harmony by his wiſe regulations, and he and his deſcendants took the name of inca, which ſignifies king or great lord. Theſe incas became ſo powerful, that they rendered themſelves maſters of all the country from Paſto to Chili, and from the river Maule on the ſouth, to the river Augaſmago, on the north; theſe two rivers forming the bounds of their empire, which extended above thirteen hundred leagues in length. This they enjoyed till the diviſions between inca Guaſcar and Atabalipa, which the Spaniards laying hold of, made themſelves maſters of the country, and deſtroyed the empire of the incas.

INCAMERATION, a term uſed in the chancery of Rome, for the uniting of lands, revenues, or other rights, to the pope's domain.

INCANTATION, denotes certain ceremonies, accompanied with a formula of words, and ſuppoſed to be capable of raiſing devils, ſpirits, &c. See the articles, CHARM, CARMEN, &c.

INCAPACITY, in the canon-law, is of two kinds: 1. The want of a diſpenſation for age in a minor, or legitimation in a baſtard, and the like: this renders the proviſion of a benefice void in its original. 2. Crimes and heinous offences, which annul proviſions at firſt valid.

INCARNATION, in theology, the act whereby the ſecond perſon of the holy Trinity aſſumed the human nature, *viz.* a true body and reaſonable ſoul, in order to accompliſh the redemption of fallen mankind.

This fundamental doctrine of chriſtianity is very expreſly taught in ſcripture: thus, in Gal. iv. 4. it is ſaid, "God ſent forth "his ſon, made of a woman:" and 1 John iv. 14. "And we have ſeen and "do teſtify, that the Father ſent the Son "to be the ſaviour of the world."

The generation of Chriſt was miraculous, as being conceived by the power of the Holy Ghoſt, and born of the Virgin Mary; from the time of which bleſſed nativity, the chriſtian æra commences. See the article EPOCHA.

INCARNATIVES, in ſurgery, medicines which aſſiſt nature in filling up wounds or ulcers with fleſh; or rather remove the obſtructions thereto. See VULNERARY. Internal incarnatives are aliments which ſupply a balſamic chyle, and conſequently generate fleſh, and produce a full or plump habit.

INCARNATIVE, or UNITING BANDAGE, is a bandage of the head, ſo called from its being uſed to unite the lips of a wound. It is about two inches broad, having a longitudinal ſlit in its middle, about the length of three or four fingers breadth. See plate XXV. fig. 3. nº 6.

The chief uſe of this bandage is to retain the lips of a rectilinear wound cloſe together, whether in the head, eye-lids, or other parts of the body. For the method of applying it, roll up each end, and after the wound has been dreſſed with proper balſams, and a plaſter and two narrow compreſſes laid on each ſide, the ſlit of the bandage is to be fixed near the wound, in ſuch a manner, that one of its ends being carried round the head, and the roller being paſſed through the ſlit, both of the rollers are drawn tight, ſo as to bring the lips of the wound cloſe together. The two rollers in each hand being then exchanged, and croſſed upon the forehead, and the like being done under the chin, as long as the bandage will permit, each end of it is to be faſtened by pins or ſuture. This bandage is not to be taken off till the lips of the wound may be ſuppoſed to be united; unleſs any urgent ſymptoms ſhould require its removal.

INCARTATION, among chemiſts, the ſame with depart. See DEPART.

INCENSE, or FRANK-INCENSE, in the materia medica, &c. a dry reſinous ſubſtance, known among authors by the names thus and olibanum. See the article OLIBANUM.

Incenſe is a rich perfume, with which the antient pagans, and the roman catholics ſtill, perfume their temples, altars, &c. The burning of incenſe made part of the daily ſervice of the antient jewiſh church. The prieſts drew lots to know who ſhould offer it; the deſtined perſon took a large ſilver diſh, in which was a cenſer full of incenſe; and being accompanied by another prieſt, carrying ſome live coals from the altar, went into the temple. There, in order to give notice to the people, they ſtruck upon an inſtrument of braſs placed between the temple and the altar; and being returned to the altar, he who brought the fire left it there, and went away. Then the offerer of incenſe having ſaid a prayer or two, waited the ſignal, which

which was the burning of the holocaust; immediately upon which he set fire to the incense, the whole multitude continuing all the time in prayer. The quantity of incense offered each day, was half a pound in the morning, and as much at night.

One reason of this continual burning of incense might be, that the multitude of victims that were continually offered up, would have made the temple smell like a slaughter-house, and consequently have inspired the comers rather with disgust and aversion than awe and reverence, had it not been overpowered by the agreeable fragrance of those perfumes.

INCEPTIVE, a term used by Dr. Wallis to express such moments, or first principles, which, though of no magnitude themselves, are notwithstanding capable of producing it. Thus, a point is inceptive of a line, and a line inceptive of surface, *&c.*

INCEST, the crime of venereal commerce between persons who are related in a degree wherein marriage is prohibited by the law of the country.

Some are of opinion that marriage ought to be permitted between kinsfolks, to the end that the affection so necessary in marriage might be heightened by this double tie, and yet the rules of the church have formerly extended this prohibition even to the seventh degree; but time has now brought it down to the third or fourth degree.

Most nations look on incest with horror, Persia and Egypt alone excepted. In the history of the antient kings of those countries we meet with instances of the brother's marrying the sister; the reason was, because they thought it too mean to join in alliance with their own subjects, and still more so to have married into any foreign family.

INCEST SPIRITUAL, a crime committed in like manner between persons who have a spiritual alliance by means of baptism or confirmation.

Spiritual incest is also understood of a vicar or other beneficiary, who enjoys both the mother and the daughter, that, is, holds two benefices, the one whereof depends upon the coalition of the other. Such a spiritual incest renders both the one and the other of these benefices vacant.

INCH, a well known measure of length; being the twelfth part of a foot, and equal to three barley-corns in length. See FOOT and MEASURE.

INCH OF CANDLE, or sale by inch of candle. See the article CANDLE.

INCHASING, or ENCHASING. See the article ENCHASING.

INCIDENCE, in mechanics, denotes the direction in which one body strikes on another.

In optics, the angle ACP, (pl. CXLIV. fig. 2. n° 1.) made by the ray AC, and the perpendicular PC, is called the angle of incidence; but Dr. Barrow, and some others, call it the angle of inclination; and by the angle of incidence understand its complement ECA.

Mr. Molyneux, in his Dioptrics, uses the words inclination and incidence promiscuously, and by the angle of incidence or inclination, always intends the angle ACP.

The angle PCB, is called the angle of reflection, and is always equal to the angle of incidence ACP; which is thus proved:

Every ray of light goes the shortest way that possibly it can: thus, if you suppose the ray AC, (*ibid.*) to fall on the plain glass or surface EG, and thence to be reflected to B, so that the angle ACE be equal to BCG; then will AC and CB, be the two shortest lines that can possibly be drawn from the points A and B, to the point of incidence C in the plane EG: for instance, they will be shorter than $AD + DB$, or any others.

For produce CB to F, and draw DF, because the vertical angles ECF and BCG are equal, the arch EF is equal to BG, equal to AE by the supposition; but it is plain, that $FC = AC = CB$; wherefore FB ($= AC + CB$) is less than $DF + DB = AD + DB$: and so it will be in every case. Wherefore, since the ray must go the nearest way, the angle of incidence will always be equal to that of reflection: For the two angles ECA, and BCG, being thus equal, their compliments ACP and PCB must also be equal, and may be thus proved. Produce the ray AC directly till it meet with the perpendicular GH in H: then make GK equal GH, and produce CB to K: I say CK is the reflected ray, and that the angle PCK is equal to PCA: for PC being drawn perpendicular to the plane EG the angles $ECA + ACP$ are equal to the angles $GCB + KCP$; because they

they are both equal to a right angle. But E C A is equal to G C H, which is equal to G C K by construction; and therefore the angle of incidence, A C P, is equal to the angle of reflection, P C K. Q.E.D.

It is likewise demonstrated in optics, that the sines of the angles of incidence, and refraction, are to each other reciprocally as the resistances of the mediums. And Sir Isaac Newton, in his optics, says, the sine of incidence is either accurately, or very nearly in a given ratio to the sine of refraction. And that the angles of reflection, and refraction, lie in one and the same plane with the angle of incidence. Whence, if that proportion be known in any inclination of the incident ray, it is known in all the inclinations, and thereby the refractions in all cases of incidence on the same refracting body may be determined. Thus, if the refraction be made out of air into water, the sine of incidence of the red light is to the sine of its refractions as 4 to 3. If out of air into glass, the sines are as 17 to 11. In light of other colours, the sines have other proportions; but the difference is so little, that it need seldom be considered.

Suppose therefore, that R S, (*ibid.* n° 2.) represents the surface of stagnating water, and that C is the point of incidence in which any ray coming in the air from A in the line A C, is reflected or refracted, and I would know whither this ray shall go after reflection or refraction: I erect upon the surface of the water, from the point of incidence, the perpendicular CP, and produce it downwards to Q, and conclude from what has been said, that the ray after reflection and refraction, shall be found somewhere in the plane of the angle of incidence, ACP, produced. I let fall therefore, upon the perpendicular CP, the sine of incidence A D; and if the reflected ray be desired, I produce A D to B, so that D B be equal to A D, and draw C B. For this line C B shall be the reflected ray, the angle of reflection BCP, and its sine B D, being equal to the angle and sine of incidence. But if the refracted ray be desired, I produce A D to H, so that D H may be to A D as the sine of refraction to the sine of incidence, that is, (if the light be red) as 3 to 4; and about the center C, and in the plane A C P, with the radius C A, describing a circle A B E, I draw parallel to the perpendicular C P Q, the line H E cutting the circumference in E, and joining C E, this line C E shall be the sine of the refracted ray. For if E F be let fall perpendicularly on the line P Q, this line E F shall be the sine of refraction of the ray C E, the angle of refraction being E C Q; and this sine E F is equal to DH, and consequently in proportion to the sine of incidence A D as 3 to 4.

INCIDENT, in law, something that inseparably belongs to another: thus, a court baron is incident to a manor.

INCIDENT, in poetry, denotes much the same with episode. See EPISODE.

INCISIVE, an appellation given to whatever cuts or divides: thus, the fore-teeth are called dentes incisivi, or cutters; and medicines of an attenuating nature, incidents, or incisive medicines. See the articles TOOTH and ATTENUANTS.

INCLE, a kind of tape made of linen-yarn, which on importation pays for every dozen pounds, a duty of 1 l. 5 s. $8\frac{80}{100}$d. and draws back 1 l. 1 s. $11\frac{20}{100}$d. on exportation; for the dozen pieces in rolls, containing thirty-six yards each, 19 s. $3\frac{60}{100}$d. and draws back 16 s. $5\frac{40}{100}$d. and for every pound weight of whitened or bleached linen-yarn, known by the name of unwrought incle, or short spinnel, 3 d.

INCLINATION, is a word frequently used by mathematicians, and signifies the mutual approach, tendency or leaning of two lines, or two planes towards each other, so as to make an angle.

Inclination of a right line to a plane, is the acute angle, which that line makes with another right line drawn in the plane through the point where the inclined line intersects it, and through the point where it is also cut by a perpendicular drawn from any point of the inclined plane.

Inclination of the axis of the earth, is the angle which it makes with the plane of the ecliptic; or the angle, contained between the planes of the equator and ecliptic.

Inclination of a planet, is an arch of the circle of inclination, comprehended between the ecliptic and the plane of a planet in its orbit.

The greatest inclination of saturn, according to Kepler, is 2° 32′; of jupiter, 1° 20′; of mars, 1° 50′ 30″; of venus, 3° 22′; of mercury, 6° 54′. According to de la Hire, the greatest inclination of

saturn

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Fig. 1. INCLINED PLANE.

No. 1. No. 2. No. 3.

Fig. 2 INCLINED TOWER.

Fig. 4. INDIVISIBLES.

Fig. 3. INDENTED.

Fig. 5. INVECTED.

J. Jeffery

ſaturn is $2^\circ\ 33'\ 30''$; of jupiter, $1^\circ\ 19'\ 20''$; of mars, $1^\circ\ 51'\ 00''$; of venus, $3^\circ\ 25'\ 5''$; of mercury, $6^\circ\ 52'\ 00''$.

Inclination of a plane, in dialling, is the arch of a vertical circle, perpendicular both to the plane, and the horizon, and intercepted between them. To find this, Let A B (plate CXLIV. fig. 3.) be a plane inclined to the horizon H R; apply to the plane A B a quadrant D C F, ſo as the plummet C E may cut off any number of degrees on the limb as E F: I ſay the arch D E is the meaſure of the angle of inclination A B H; for draw B G perpendicular to H R, then becauſe C E is parallel to B G, the angle E C F is equal to C B G; but C D F is equal to G B H, being both right angles, therefore the angle D C F — E C F, is equal to the angle G B H — C B G; that is, D C E is equal to A B H. Q. E. D.

INCLINED PLANE, in mechanics, one that makes an oblique angle with the horizon.

If a force, with a given direction, ſupports a weight upon an inclined plane; that force is to the weight, as the ſine of the inclination of the plane to the ſine of the angle which is made by the line in which the force acts, and the line perpendicular to the plane. Thus, let A B (plate CXLV. fig. 1. n° 1.) be the inclined plane, P the weight ſupported, and D P V the direction of the force which ſupports the weight. Let P C be drawn perpendicular to A B; and from the point C, let C B be drawn parallel to the horizon, and perpendicular to the common ſection of the plane and the horizon, meeting the plane in B; and C A perpendicular to the horizon and alſo to C B, meeting the plane in A, and the line in which the force acts in V.

Now P may be conceived to be held unmoved by three forces acting together, one of which is the force of the weight itſelf tending downwards in a line parallel to V C, *viz.* P H; the ſecond is the force acting in the line D P V, and the third is the reſiſtance of the plane itſelf, acting in the line C P, perpendicular to the plane: but theſe three forces are to each other as the ſides of the triangle V P C, as will be evident by drawing a line through P parallel to V C, and completing the parallelogram H *v*. The force, therefore, is to the weight which it ſuſtains, as P V to V C; that is, as the ſine of the angle V C P, or A B C, to the ſine of the angle C P V, or C P D. Q. E. D.

Therefore the force by which any heavy body would deſcend on any inclined plane, to the force of the deſcent on the perpendicular, is as the ſine of the angle of the plane's inclination to the radius. For practice therefore, let the weight of any body be W, and P the power wanted to ſuſtain it on an inclined plane. I ſay, by this theorem. R : W :: ſine incli. : P. The three firſt of which are given, wherefore the fourth is found by trigonometrical calculation, thus. Let a body weigh 9999 pounds; what power will ſuſtain it from deſcending on a plane inclined to the horizon with an angle of 34 degrees? Anſwer, 5592 pounds. See the work.

Weight 9999· 3·999957
S. ∟ incl. = 34° 9·747562
13·747519
Radius 10.000000
5592 = 3·747519 = the power.

If the points V and A coincide, that is, if the force acts according to the direction B A, the angle C P D, will be a right angle; and therefore, in that caſe, the force is to the weight as the ſine of the inclination of the plane to the radius, or as the height A C to its length A B. And in this caſe, the force which is required to ſupport a given weight is leaſt of all; becauſe the proportion of the ſine of the inclination of the plane to the radius, is leſs than its proportion to any other ſine whatever. If the point V falls above A; the greater the angle A P V is, ſo much the more force is neceſſary to ſupport the given weight upon the plane A B. Inſomuch that by increaſing the angle A P V, the proportion of the ſine of the angle A B C, to the ſine of the angle C P D, is alſo increaſed, till P V, A V, becoming parallel, and the angles V C P, C P D for that reaſon equal, the force and the weight will alſo become equal. So likewiſe if the point V falls below A, as at *v*, the force required to ſupport the given weight, is again increaſed; the angle A P *v* being increaſed, till P *v*, *v* C become equal, and then the force and the weight will become equal again. Further, when the lines P *v*, P C coincide, and the angle *v* P C by that means vaniſhes, the ſine of the angle A B C will bear an infinite proportion to the ſine of that; that is, no finite force whatſoever, acting in a line perpendicular to the plane, will be able to ſupport the weight upon the plane. If the line

in which the force acts be parallel to the base of the plane, the weight is to the force which supports it, as B C to C A, or as the base of the plane to the height of it. If from the point P, *(ib* n° 2.) PF be let fall perpendicular to B C ; and from the point C, C G perpendicular to V P ; it will easily appear, that P V is to V C (that is, the force is to the weight) as C F to C G. Wherefore the force and the weight will then support one another upon an inclined plane, when they are to each other reciprocally as perpendiculars drawn from the point C to the lines in which they act ; (or, if G C F be looked upon as an angular balance moveable about the center C) reciprocally as the velocities of the points G and F reckoned upon the lines in which the forces act.

If it should be required to lift up a very heavy body, as W or *w (ibid.* n° 3.) the height C B, it would be impracticable to raise it up in the line C B without a power whose intensity is equal to that of the weight; and even in that case very inconvenient to do it, especially in building. But if an inclined plane A B be laid arising from the horizontal line A C, from whence the weight is to be raised, a less power than the weight will serve for that purpose, unless it pushes the body directly against the plane (as in the direction W T) or draws the body away from the plane (as from W towards *e, t*, or L) or in any direction on that side of the line E *e*.

The direction in which the body can most easily be drawn or pushed up the plane is the line W *w* M, parallel to the plane, and passing thro' the center of the weight ; for whether the power divides a plane *k* K (in a direction perpendicular to it) along the line W M, or the power P (by its descent to *p)* draws it in the same line, the velocity of the power will be equal to the line W *w*, the space described by the center of gravity of the weight, whilst the same weight rises only the perpendicular height Z B (= *n* W) or has the said line properly to express its velocity. If the body was a cylinder, as a rolling stone, and the plane T *t* were to pass thro' the gudgeons or axis of the said stone, it is evident that the case would be the same ; and as the weight P has its rope running over the roller (or upper pulley M, the line P *p* will be the velocity of the power. Therefore in this case the weight (if kept in æquilibrio) will be to the power as W *w* (= T B) to *w* Y (= B Z) or as the hypothenuse A B is to the perpendicular B C, which (by Eucl. 4. 6.) are in the same proportion ; and consequently, if the power be never so little increased, it will draw the weight up the plane.

That the power acts with the greatest advantage, whilst it draws in the line of direction W *w* (parallel to the plane) is evident, because if, one end of the said plane of direction remaining fixed at W, the other should move towards B, or beyond it, then the body would be partly drawn against the plane, and therefore the power must be increased in proportion to the greatest difficulty of traction : and if the end *w* of the line abovementioned should be carried to D, or beyond it, the power must be also increased, inasmuch as it endeavours to lift the body off from the plane.

If the power draws in a line of direction W B *(ibid.)* parallel to the base of the plane ; then, in order to keep the weight W in æquilibrio by the power π, the said power must be to the weight, as Z B to Z T, or as the perpendicular B C to the base A C of the triangle A B C. For if we suppose the pulley R at so great a distance from W, that the line of direction W R may not sensibly alter its horizontal position, whilst the body W rises the height B Z, in such manner that π ϖ (= W Y, and not W *w)* will be the velocity of the power. So that the velocity of the power to that of the weight will not be as the hypothenuse to the perpendicular, as in the former case, but as the base to the perpendicular in the triangle A C B. If the powers be increased just enough to overcome the friction of the plane, and draw up the body W, let the pulley R be lifted up gradually to *r*, so as to keep the line W R parallel to itself till it co[illegible] to ϖ*r*, and the power will be descen[illegible] when the weight is come to [illegible] But [illegible] together with the distan[illegible] is equal to π ϖ, or WY, &c. And [illegible]tion, being constantly made in th[illegible] B T, is the case.

For the [illegible]n of the loaded cylinder upon an in[illegible]ed plane, see CYLINDER.

INCLINED TO[illegible]ERS, those whose tops hang so far over, as to appear dangerous to people w[illegible]ing below.

Such is that represented in plate CXLV. fig. 2. where PP is the perpendicular let fall from the top of the tower to TT the horizontal plane. Now the reason why such towers do not fall, is owing to their



their centers of gravity being supported: thus C, the center of gravity of the tower here represented, is supported by the perpendicular C O, so that it cannot fall; but had the tower been built higher to A, so as to transfer the center of gravity from C to *c*, the tower must have fallen, since the perpendicular *c o* is not supported, as falling without the foundation of the tower.

INCLINERS, or INCLINING DIALS. See the article DIAL.

INCLOSURE, in husbandry, the fence or hedge made to inclose lands. See the articles FENCE and HEDGE.

A very good inclosure may be made of elder-sticks, or truncheons, cut ten or twelve feet long, and stuck into the bank slope-wise, so as to make a chequer-work. These make the speediest shelter of any; and when the trees are grown up, they are valuable for the turner's use. They succeed extremely well in watery places; and when planted on the banks of rivers, they prevent them from being undermined by the current.

The throwing down inclosures is an offence punishable by our antient statutes; yet if the lord of a manor incloses part of the waste, and does not leave sufficient room for the commoners, they may break down such inclosure, or have a writ of assize.

INCOGNITO, or INCOG, is applied to a person that is in any place, where he would not be known: but it is more particularly applied to princes, or great men, who enter towns, or walk the streets without their ordinary train, or the usual marks of their distinction and quality.

INCOMBUSTIBLE, something that cannot be burnt, or consumed by fire.

Authors talk much of an incombustible cloth, made of the asbestus. See the article ASBESTUS.

In the Philosophical Transactions, n° 276, we have an account of an incombustible lint, which is a peculiar species of asbestus, or earth-flax, which is never formed into compact masses as the other species are, but is always found in loose filaments, very fit to be wrought into cloth. It is found only, so far as yet known, in the county of Aberdeen in Scotland.

The antient Romans spun their asbestus into cloths, in which they wrapped up dead bodies, before committing them to the funeral pile, in order to preserve their ashes distinct from those of the wood. What they had for this purpose, seems, by all accounts, to have been very short; but this species would be much more proper, as being seven or eight inches long.

INCOMMENSURABLE, a term in geometry, used where two lines, when compared to each other, have no common measure, how small soever, that will exactly measure them both. And in general, two quantities are said to be incommensurable, when no third quantity can be found that is an aliquot part of both.

Such are the diagonal and side of a square; for tho' each of those lines have infinite aliquot parts, as the half, the third, *&c.* yet not any part of the one, be it ever so little, can possibly measure the other, as is demonstrated in prop. 117. lib. x. of Euclid.

Pappus, lib. iv. prop. 17. speaks also of incommensurable angles. As to surfaces which cannot be measured by a common surface, they are said to be incommensurable in power.

INCOMMENSURABLE NUMBERS are such as have no common divisor, that will divide them both equally.

INCOMPATIBLE, that which cannot subsist with another, without destroying it: thus cold and heat are incompatible in the same subject, the strongest overcoming and expelling the weakest.

INCORPORATION, in pharmacy, is much the same as impastation, being a reduction of dry substances to the consistence of a paste, by the admixture of some fluid; thus pills, boles, troches, and plasters are made by incorporation.

Another incorporation is, when things of different consistences, are by digestion reduced to one common consistence.

INCORPOREAL, a thing, or substance, which has no body; as God, angels, and the soul of man.

INCORRUPTIBLE, that which cannot be corrupted. See CORRUPTION.

INCORRUPTIBLES, or INCORRUPTICOLÆ, in church-history, heretics which had their original at Alexandria, in the time of the emperor Justinian. Their distinguishing tenet was, that the body of Jesus Christ was incorruptible from his conception, by which they meant that after and from the time he was formed in the womb of his holy mother, he was not susceptible of any change or alteration, not even of any natural and innocent passions, as hunger, thirst, *&c.* so that he eat without any occasion before his death, as well as after his resurrection.

IN-

INCRASSATING, in pharmacy, *&c.* the rendering fluids thicker by the mixture of other ſubſtances leſs fluid; or by the evaporation of the thinner parts.

Incraſſating medicines are ſuch as reduce the too fluid blood and juices to a proper conſiſtence, and a due condenſation.

INCROACHMENT, in law, ſignifies an unjuſt gaining upon the eſtate or poſſeſſion of another, as where a perſon ſets his wall or hedge too far into the ground of his neighbour. A rent may be likewiſe ſaid to be incroached upon, where the lord, by diſtreſs or other means, compels his tenant to pay more than he owes. Sometimes this word has been applied to power and authority, as where any officer, deputed by the king, aſſumes to himſelf a greater power or juriſdiction than the law intends him.

INCRUSTATION, in ſurgery, the induction of a cruſt or eſchar upon any part.

Among maſons, incruſtation ſignifies the lining or coating of a wall, either with gloſſy ſtones, ruſtics, marble, pottery, or ſtucco-work, and that either equably or in panels and compartiments.

INCRUSTED, or INCRUSTATED COLUMN, is a column conſiſting of ſeveral pieces, or ſlips of ſome precious marble maſticated or cemented round a mould of brick, or other matter.

INCUBATION, the action of a hen, or other fowl brooding on her eggs.

INCUBUS, or NIGHT MARE, in medicine, the name of a diſeaſe which conſiſts in a ſpaſmodic contraction of the muſcles of the breaſt, uſually happening in the night, and attended with a very painful difficulty of reſpiration and great anxiety. The moſt obvious ſymptom of this diſeaſe is a ſenſation like that of ſome great weight laid upon the breaſt: this is attended with ſo violent a cohibition of reſpiration, that the perſon becomes unable to move any part of his body, or to utter any diſtinct or articulate ſound. This whole complaint goes off as ſoon as any one limb is moved, but there is oftentimes an univerſal laſſitude of the whole body left behind it, which remains for ſome ſpace of time.

This diſeaſe attacks people in the night-time, in a ſort of middle ſtate, between ſleeping and waking; and commonly, as Willis obſerves, when the ſtomach is oppreſſed with aliment of a hard digeſtion, eſpecially if the patient lies on his back. Thoſe of a plethoric habit are moſt ſubject to it; and among them, ſuch particularly as have a great thickneſs of the blood; as alſo perſons who are ſubject to hypochondriac complaints, and to diſorders of the ſpleen.

Hence the cauſes of this diſeaſe are a ſtagnation of the blood in plethoric habits, where it is thick about the vena portæ, which nature is endeavouring to throw off by means of thoſe ſpaſmodic motions which conſtitute this diſeaſe, and very often crudities in the primæ viæ become additional cauſes, and exaſperate the complaint. Phyſicians eſteem this diſeaſe of no danger; but Junker thinks it is much to be ſuſpected, that many of thoſe people, who are found dead in their beds, periſh by it.

When this diſtemper returns ſo often as to call for the advice of a phyſician, the method is to give gentle purges, three or four times, with the digeſtive medicines: ſuch as gum ammoniacum, or the tartarum vitriolatum: on the intermediate days after this, bleeding in the foot is proper; and when this has been done, powders of nitre and cinnabar uſually complete the cure. If they fail, the common method in hypochondriac caſes is to be uſed. When there are crudities in the primæ viæ which exaſperate this diſeaſe, then, after the purges, gentle bitters and other medicines are to be given, which will reſtore the tone of the ſtomach. Gentian-root and orange-peel in infuſion, are very good for this purpoſe. When it happens wholly from a load on the ſtomach, a gentle vomit alone will perform the cure. To prevent returns of this diſeaſe, the patient ſhould eat light ſuppers, and muſt accuſtom himſelf to lie on one or the other ſide, never on the back, nor with his head very low.

Heiſter obſerves, that thoſe who have troubled dreams, or walk in their ſleep, are to be cured in the ſame manner, as proceeding from the ſame cauſes.

INCUMBENT, a clerk, or miniſter who is reſident on his benefice: he is called incumbent, becauſe he does, or at leaſt ought, to bend his whole ſtudy to diſcharge the cure of his church.

INCUMBRAVIT, or QUARE INCUMBRAVIT, in law. See QUARE.

INCURVATION *of the rays of light*, their bending out of a rectilinear or ſtraight courſe, occaſioned by refraction. See the article REFRACTION.

INCUS,

INCUS, in anatomy, a bone of the internal ear, fomewhat refembling one of the anterior dentes molares.

In the incus, we are chiefly to obferve its body, its fovea, or hollow, ferving for its articulation with the malleus, and its two crura, or legs; to the longer of which, there is joined another bone called the ftapes. See EAR.

INDEFEISIBLE, or INDEFEAZABLE, a term in law, for what cannot be defeated or made void; as an indefeifible eftate of inheritance, *&c.*

INDEFINITE, or INDETERMINATE, that which has no certain bounds; or to which the human mind cannot affix any. Defcartes makes ufe of this word in his philofophy inftead of infinite, both in numbers and quantities, to fignify an unconceivable number, or a number fo great that an unit cannot be added to it; and a quantity fo great as not to be capable of any addition. Thus, he fays, the ftars vifible and invifible are in number indefinite; and not as the antients held infinite; and that quantity may be divided into an indefinite number of parts, not an infinite number.

INDEFINITE is alfo ufed in the fchools to fignify a thing that has but one extreme; for inftance, a line drawn from any point and extended infinitely. Thus what they call eternity *a parte ante*, and eternity *a parte poft*, are indefinite durations.

INDEFINITE PROPOSITION. See the article PROPOSITION.

INDEFINITE, in grammar, is underftood of nouns, pronouns, verbs, participles, articles, *&c.* which are left in an uncertain indeterminate fenfe, and not fixed to any particular time, thing, or other circumftance.

INDELIBLE, fomething that cannot be cancelled, or effaced. Thus baptifm and ordination, according to the church of Rome, are facraments which convey indelible characters to the perfons baptifed and ordained.

INDEMNITY, in law, the faving harmlefs; or, a writing to fecure one from all damage and danger that may enfue from any act. An indemnity in regard to eftates, is called a warranty. See the article WARRANTY.

Act of INDEMNITY, the fame with act of grace. See *Act of* GRACE.

INDENTED, in heraldry, is when the out-line of an ordinary is notched like the teeth of a faw. See plate CXLV, fig. 3.

INDENTED LINE, in fortification, the fame with what the french engineers call redent; being a trench and parapet running out and in, like the teeth of a faw; and is much ufed in irregular fortification. See the article FORTIFICATION.

INDENTED LEAF, among botanifts, is one notched round its verge. See SERRATED.

INDENTURE, in law, a deed or writing, wherein is contained fome article, covenant, contract, or conveyance made between two or more perfons; and which is indented or tallied at the top thereof, anfwerable to another part of the fame deed, *&c.* and having the fame contents. It differs from a deed-poll, in that this laft is a fingle deed, and unindented. See DEED.

INDEPENDENTS, a fect of proteftants in England and Holland, fo called from their independency on other churches, and their maintaining that each church or congregation has fufficient power to act and perform every thing relating to religious government within itfelf, and is no way fubject or accountable to other churches or their deputies.

They therefore difallow parochial and provincial fubordination, and form all their congregations upon a fcheme of co-ordinancy. But tho' they do not think it neceffary to affemble fynods; yet if any be held, they look on their refolutions, as prudential councils; but not as decifions, to which they are obliged to conform.

As to their fervice, they pray publicly for kings, and all in authority: they read and expound the fcriptures, and adminifter the facraments of baptifm and the Lord's Supper. Their public officers are paftors, teachers, ruling elders, and deacons. Their church cenfures lie all within the compafs of admonition and excommunication.

The prefent independents differ from the prefbyterians only in their church government, in being generally more attached to the doctrines diftinguifhed by the term orthodoxy, fuch as original fin, election, reprobation, *&c.* and in adminiftring the Lord's Supper at the clofe of the afternoon's fervice. See PRESBYTERIANS.

The feveral fects of baptifts are all independents with refpect to church government; and, like them, adminifter the Lord's Supper in the evening, whereas the prefbyterians adminifter it after the forenoon's fervice. See ANABAPTISTS.

INDETERMINATE, in general, an appella-

pellation given to whatever is not certain, fixed, and limited; in which ſenſe, it is the ſame with indefinite.

INDETERMINATE PROBLEM, in algebra, one which is capable of an indefinite number of ſolutions. See EQUATION.

INDEX, in anatomy, the ſame with the fore-finger. See FINGERS.

INDEX, in arithmetic and algebra, ſhews to what power any quantity is involved, and is otherwiſe called exponent. See the article EXPONENT.

INDEX *of a logarithm*, that which ſhews of how many places the abſolute number, belonging to a logarithm, doth conſiſt; and of what nature it is, whether an integer or fraction. Thus, in this logarithm 2.523421, the number 2 ſtanding on the left hand of the point is called the index; becauſe it ſhews that the abſolute number, anſwering to the above logarithm, conſiſts of three places: for the number is always one more than the index.

If the abſolute number be a fraction, then the index of the logarithm hath a negative ſign, marked thus $\bar{2}.523421$. See the article LOGARITHM.

INDEX *of a globe*, the little ſtyle or gnomon, which being fixed on the pole of the globe, and turning round with it, points out the hours upon the hour circle. See the article GLOBE.

Expurgatory INDEX, a catalogue of prohibited books in the church of Rome.

The firſt catalogues of this kind were made by the inquiſitors, and theſe were afterwards approved of by the council of Trent, after ſome alteration was made in them by way of retrenchment, or addition. Thus an index of heretical books being formed, it was confirmed by a bull of Clement VIII. in 1595, and printed with ſeveral introductory rules; by the fourth of which, the uſe of the ſcriptures in the vulgar tongue is forbidden to all perſons, without a particular licence; and by the tenth rule it is ordained, that no book ſhall be printed at Rome, without the approbation of the pope's vicar, or ſome perſon delegated by the pope; nor in any other place, unleſs allowed by the biſhop of the dioceſe, or ſome perſon deputed by him, or by the inquiſitor of heretical pravity.

The Trent index being thus publiſhed, Philip II. of Spain ordered another to be printed at Antwerp, in 1571, with conſiderable enlargements. Another index was publiſhed in Spain, in 1584, a copy of which was ſnatched out of the fire when the Engliſh plundered Cadiz. Afterwards there were ſeveral expurgatory indexes, printed at Rome and Naples, and particularly in Spain.

INDIA PROPER, or HITHER INDIA, a large peninſula in Aſia, bounded on the north by Uſbec Tartary, and Thibet; on the eaſt, by another part of Thibet, the kingdom of Aſem, Ava, and Pegu; on the ſouth by the bay of Bengal, and the Indian ocean; and by the ſame ocean and Perſia on the weſt: ſituated between 66° and 92° of eaſt longitude, and between 7° and 40° of north latitude; being about 2000 miles in length from north to ſouth, and 1500 miles in breadth from eaſt to weſt, where broadeſt; tho' the ſouthern part of the peninſula is not 300 miles broad. All the country within theſe limits is either ſubject or tributary to the great Mogul. It is frequently called Indoſtan, a name ſuppoſed to be derived from the river Indus, on its weſtern frontiers: it is alſo called the Moguliſtan, from the imperial family now upon the throne, who trace their pedigree from Tamerlane, a Mogul Tartar.

The produce of this country, and what the Europeans import from thence, is chiefly chints, callicoes, muſlins, ſome ſilk, pepper, and diamonds, which are purchaſed by moſt nations with ſilver; but the Dutch frequently barter ſpices for them, which makes the India trade doubly advantageous to them.

INDIA BEYOND THE GANGES, is a country bounded by Thibet and Boutan on the north; by China, Tonquin, and Cochin-China on the eaſt; by the Indian Ocean on the ſouth; and by the hither India, the bay of Bengal, and the Straits of Malacca on the weſt: it is ſituated between 92 and 104° of eaſt longitude, and between the equator and 30° degrees of north latitude: being near 2000 miles in length from north to ſouth; but of a very unequal breadth; in which limits are comprehended the kingdoms of Aſem, Ava, Pegu, Laos, Siam, Cambodia and Malacca, governed by as many indian princes; only the Dutch have uſurped the dominion of Malacca. In this country there are a vaſt number of elephants, and conſequently a great deal of ivory; our merchants alſo meet with gold and precious ſtones, canes, opium, and ſuch other articles as are uſually found within the tropics.

INDIA LEAF, the leaf of a large and lofty

lofty tree, called malabathrum, which grows in Malabar, principally upon the mountains.

The antients have faid much of the virtues of the malabathrum; they call it ftomachic, fudorific and cephalic. Diofcorides afcribes to it all the virtues of the indian fpikenard, and fays, that it poffeffes them in a fuperior degree: but at prefent it is utterly difregarded, and only kept in the fhops as an ingredient in the theriaca, mithridate, and fome other compofitions.

INDICATION, in phyfic, whatever ferves to direct the phyfician how to act.

There are four forts of indications, 1. The prophylactive or prefervative, which directs what is neceffary to be done, in order to preferve health, and avert threatned difeafes. 2. Curative, fhewing how to remove difeafes actually formed. 3. Palliative, or mitigatory, which relates to the mitigation of the fymptoms, when too violent to be neglected till the termination of the difeafe. 4. Vital, which relates to the immediate prefervation of life.

INDICATIVE, in grammar, the firft mood, or manner, of conjugating a verb, by which we fimply affirm, deny, or afk fomething; as, *amant*, they love; *non amant*, they do not love; *amantne*, do they love?

INDICATIVE COLUMN. See COLUMN.

INDICAVIT, in law, a writ or prohibition that lies for a patron of a church, whofe clerk is fued in a fpiritual court by another clerk for tythes, amounting to the fourth part of the profits of an advowfon; for then the fuit belongs to the king's court.

This writ cannot be had before the defendant is libelled in the ecclefiaftical court, a copy of which muft be produced in the court of chancery, before the writ is granted; and brought before judgment is given in the fpiritual court, otherwife the indicative will be void.

INDICTION, in chronology, a cycle of fifteen years. See CYCLE.

The roman or papal indiction, which is that ufed in the pope's bulls, begins on the firft of January; and by it the popes have dated their acts ever fince Charlemain made them fovereigns. But befides this, there are other two kinds of indiction mentioned by authors, *viz.* that of Conftantinople, beginning on the firft of September; and the imperial or cæfarian indiction, which commenced on the 14th of September.

INDICTION is alfo ufed for the convoking an ecclefiaftical council or affembly. See the article COUNCIL.

INDICTIVE FEAST DAYS, *indictivæ feriæ*, the fame with thofe called conceptive. See the article FERIÆ.

INDICTMENT, in law, is a bill or declaration of complaint, at the fuit of the king, drawn up in form of law, and exhibited againft a perfon, and afterwards preferred to the grand jury or inqueft, who are to find whether the complaint be true or not. An indictment differs from an accufation only in this, that the preferrer of the bill is not tied to the proof thereof, under any penalty, except there appear to be a confpiracy.

As indictments are purely for the good and quiet of the common-wealth, they are to be preferred for criminal, not civil matters. They are ufed in cafes of high treafon, and petit treafon, felony, and trefpaffes of all kinds, and in all pleas of the crown; though they cannot be ufed for injuries of a private nature, that neither concern the king nor the public: and therefore all indictments ought to be brought for offences committed againft the common-law, or againft ftatutes; and not for every flight mifdemeanor. A perfon cannot be indicted of fufpicion of felony, but of the very crime itfelf; and then if he be not in cuftody, the fheriff is commanded to attach his body by a capias, &c. A perfon indicted for felony may have counfel allowed to fpeak for him, as to matter of law only: but fuch as are indicted for treafon may have a copy of their indictment before trial, in order to advife with counfel; and fuch indictments are to be found within three years after the offence committed, unlefs the treafon be directly againft the king's perfon.

Indictments muft be certain in every point, and charge fome particular offence; alfo goods ftolen muft be particularly fet down, and the offence laid pofitively, and not by way of recital. There muft alfo be expreffed the chriftian name, furname, and addition of the offender, with the day, year, and place in which the offence was committed, as alfo the nature of the offence. In an indictment for murder, the length, depth, or other dimenfion of the wound muft be expreffed, that a judgment may be formed whether it was

mortal: and in felony, the value of the things ftolen is to be particularly mentioned, in order that it may appear whether the offender has been guilty of grand or petit larceny. A miftake in fpelling the defendant's furname is not a fufficient caufe for abating the indictment, provided it founds like it. If a word of confequence be omitted in an indictment, it renders the whole naught; but the cafe is not the fame, where a word of form is omitted, or where there is an omiffion of a fynonymous word, if the fenfe is not injured. In cafe one part of an indictment is inconfiftent with another part of it, the indictment becomes void; tho' where the fenfe is plain, the court will difpenfe with a fmall inconfiftency. Indictments are amendable the fame term they are brought into court, but not afterwards; and in criminal profecutions, the amendment muft be only fuch as is permitted by the common law. Indictments for crimes committed, ought to be laid in the county where they were done; for otherwife, upon pleading the general iffue, not guilty, if it appears that the offence was committed in another county or place different from that in the indictment, the defendant will be acquitted. An offender is fubject to indictment, for a felony committed againft a perfon unknown; yet fome body muft be proved to be the proprietor upon the trial, or elfe the property will be prefumed to be in the prifoner, he having pleaded not guilty. An indictment being at the king's fuit, the profecutor is a good witnefs to prove the charge contained in it; and no damage can be given to the party aggrieved, except it be particularly grounded on fome ftatute. Indictments before juftices of the peace may be removed by certiorari into the king's bench.

INDIES, eaft and weft. See INDIA and AMERICA.

INDIGESTION, in medicine, a crudity, or want of due coction, either in the food, an humour of the body, or an excrement. See CRUDITY and DIGESTION.

INDIGETES, a name which the antients gave to fome of their gods.

There are various opinions about the fignification of this word; fome maintaining it was given to all the gods, in general; and others only to the femi-gods, or great men deified. Others fay, it was given to fuch gods as were originally of the country, or rather fuch as were the gods of the country that bore this name. Others again, hold, that it was afcribed to fuch gods as were patrons and protectors of particular cities.

INDIGNATORIUS MUSCULUS, a mufcle of the eye, otherwife called abducens, and rectus exterior: it has this appellation from its drawing the eye outwards, thereby occafioning the appearance of fcorn. See the article EYE.

INDIGO, in commerce, a preparation of the juice of a plant, called by fome anil, the characters of which are thefe: the cup is plane; the alæ of the flower are connivent at their upper edges, and are of the fame figure with the vexillum. It is one of the diadelphia-decandria clafs of Linnæus.

This plant grows to about two feet high, with roundifh leaves: and is a native of both the Eaft and Weft-Indies.

As to the indigo blue, it is a fecula, or fettling, made by means of water and oil olive out of the leaves of the anil, or indigo plant: there is a difference between that made by the leaves only, and that which is made of the leaves and fmall branches. The choiceft of the former fort is that which bears the furname of Serquiffe, from a village of that name fome leagues from Surat in the Eaft-Indies. It is made alfo about Biana and Coffa near Agra; and alfo in the kingdom of Golconda. In making the feculæ of anil, in order to make indigo of it, they cut the herb with a fickle, when the leaves begin to fall upon touching them; and after they have ftripped them from the branches, they put them into a fufficient quantity of water in a veffel called the fteeping vat; and let them infufe there thirty or thirty five hours; after which they turn the cock, in order to let the water run off, which is become of a green colour inclining towards blue, into a veffel of the nature of a churn, where it is worked by means of a roller or turner of wood, the ends of which are pointed and faced with iron: this they work till the water abounds with a lather; then they caft into it a little oil of olive, that is, one pound into fuch a quantity of the liquor, as will yield feventy pounds of indigo, fuch as is faleable; and as foon as the faid oil is thrown in, the lather feparates into two parts, fo that you may obferve a quantity curdled as milk is when ready to break: then they ceafe working, and let it ftand to fettle; which

when

when it has done ſome time, they open the pipe or cock of the veſſel, in order to let the water clear off, that the feculæ which is ſubſided mav remain behind at the bottom of the veſſel like the lees of wine. Then taking it out, they put it into ſtraining bags of cloth, to ſeparate what water was left: after which they convey it into cheſts or boxes that are ſhallow, to dry it; and being dried, it is what we call indigo.

Chooſe the indigo of Serquiſſe in flat cakes, of a moderate thickneſs, neither too ſoft nor too hard, of a deep violet colour, light, and ſuch as ſwims on water; and when broken, has no white ſpots in it; and, laſtly, ſuch as is copperiſh or reddiſh on being rubbed with one's nail, and has the leaſt duſt and broken pieces in it.

The other ſort of indigo is alſo the feculæ made from the anil, and differs nothing from the former, but as it is made of the whole plant, ſtalk and leaf; the beſt of which kind is that which bears the name Guatimala, that comes from the Weſt Indies. In chooſing this indigo, it ſhould be as near the other kind as can be; but the ſureſt proof of its goodneſs is its burning upon the fire like wax, and leaving only a little aſhes behind. The ſecond ſort of indigo is that of St. Domingo, differing nothing from the Guatimala, only that it is not of ſo lively a colour; the third is the Jamaica indigo; the fourth is that of the Leeward iſlands; all which are better or worſe, according as they are more or leſs neat and pure.

The uſe of the indigo is for the dyer and landreſſes, ſerving the laſt to put among their linen. The painters uſe it to grind with white for painting in blue; for if it is uſed alone and neat, it turns black; ground with yellow, it makes a green: ſome confectioners and apothecaries prepoſterouſly uſe this to colour ſugars, with which to make conſerves and ſyrup of violets, by adding ſome orrice.

From and after the 25th of March 1749, all perſons who ſhall import into Great Britain, from any of the britiſh colonies in America, in veſſels trading and manned as by law directed, any good and merchantable indigo, free from any falſe mixtures and fit for dyers uſe, being the product of the colony from whence the ſame was imported, ſhall be intitled to ſix-pence for every pound thereof, to be paid out of the cuſtoms upon demand by the collector of the port where the ſame is imported. If any perſon make entry of foreign made indigo under the name of britiſh plantation made, or ſhall mix any foreign indigo or any falſe mixture with that made in the britiſh plantations, in order to claim the premium, he ſhall forfeit the ſaid indigo; and in caſe of ſuch mixture, the quantity ſo mixed, both foreign and britiſh plantation made, and double the value thereof, ſhall be forfeited by the perſon making ſuch mixture.

Indigo of Turky, of the Weſt Indies, or rich indigo, as alſo duſt indigo, and that of the britiſh plantations, pay no duty on importation, and conſequently have no draw-back on exportation.

INDIGOFERA, *indigo*, in botany. See the laſt article.

INDIRECT *modes of ſyllogiſms*, in logic, are the five modes of the fourth figure, expreſſed by the barbarous words *baralip, celantes, dabitis, fapeſmo, friſeſom*. See MODE and FIGURE.

It is the converſion of the concluſion which renders the modes indirect; for inſtance, a ſyllogiſm in *darii*, and another in *dabitis*, would be perfectly alike were it not for that converſion; the propoſitions having the ſame quantity and the ſame quality, and the middle term being the ſubject in the major and the attribute in the minor, in both; it remains then that to make a diſtinction, that which is the ſubject of the concluſion in *darii*, be the attribute in the concluſion of *dabitis*; and that which is the attribute in the firſt, the ſubject in the laſt.

DA- Every thing that promotes ſalvation is advantageous:
RI- There are afflictions which promote ſalvation:
I. Therefore, there are afflictions which are advantageous.

DA- Every thing that promotes ſalvation is advantageous:
BI- There are afflictions which promote ſalvation:
TIS. Therefore, ſome things promoting ſalvation are afflictions.

INDIVIDUAL, *individuum*, in logic, a particular being of any ſpecies, or that which cannot be divided into two or more beings equal or alike.

The uſual diviſion in logic is made into genera or genus's, thoſe genera into ſpecies, and thoſe ſpecies into individuals.

 See

See the articles GENUS and SPECIES. The ſchoolmen make a four-fold diſtinction of individuals, *viz.*

Individuum vagum, that which, tho' it ſignifies but one thing, yet may be any of that kind: as when we ſay a man, a certain perſon, or one ſaid ſo and ſo; tho' but one perſon is meant, yet that one perſon, for aught that appears to the contrary, may be any body.

Individuum determinatum, is when the thing is named and determined, as Plato, Socrates, mount Atlas: this is alſo called individuum ſignatum.

Individuum demonſtrativum, is when ſome demonſtrative pronoun is uſed in the expreſſion, as this man, that woman.

Individuum ex hypotheſi, or by ſuppoſition, is when an univerſal name or term is reſtrained by the ſuppoſition to a particular thing; as when we ſay the ſon of Mary, inſtead of Chriſt; the writer of the trojan war, inſtead of Homer.

INDIVISIBLE, among metaphyſicians. A thing is ſaid to be indiviſible abſolute, abſolutely indiviſible, that is a ſimple being, and conſiſts of no parts into which it may be divided. Thus God is indiviſible in all reſpects, as is alſo the human mind, not having extenſion or other properties of body.

INDIVISIBLE *ſecundum quid eſt*, indiviſible with reſpect to what it now is, a ſubſtance which, though it conſiſts of parts into which it may be divided, yet never can be ſo divided as to remain the ſame: thus a meaſure or number is ſaid to be indiviſible, for if from a foot line, for example, any thing is deducted, it is no more a foot-line; and if from the number three any thing is ſubtracted, it is no longer the ſame number. See the next article.

INDIVISIBLES, in geometry, the elements or principles into which any body or figure may be ultimately reſolved; which elements are ſuppoſed infinitely ſmall: thus a line may be ſaid to conſiſt of points, a ſurface of parallel lines, and a ſolid of parallel and ſimilar ſurfaces; and then, becauſe each of theſe elements is ſuppoſed indiviſible, if in any figure a line be drawn through the elements perpendicularly, the number of points in that line will be the ſame as the number of the elements; whence we may ſee that a parallelogram, priſm, or cylinder, is reſolvable into elements or indiviſibles, all equal to each other, parallel and like to the baſe; a triangle into lines parallel to the baſe, but decreaſing in arithmetical proportion, and ſo are the circles which conſtitute the parabolic conoid, and thoſe which conſtitute, the plane of a circle, or ſurface of an iſoſceles-cone. See the article INFINITESIMALS.

A cylinder may be reſolved into cylindrical curve ſurfaces, having all the ſame height, and continually decreaſing inwards, as the circles of the baſe do on which they inſiſt.

The method of indiviſibles is only the antient method of exhauſtions, a little diſguiſed and contracted. It is found of great uſe in ſhortening mathematical demonſtrations, of which take the following inſtance in the famous propoſition of Archimedes, *viz.* that a ſphere is two thirds of a cylinder circumſcribing it.

Suppoſe a cylinder, an hemiſphere, and an inverted cone, (plate CXLV. fig. 4.) to have the ſame baſe and altitude, and to be cut by infinite planes all parallel to the baſe, of which dg is one. It is plain the ſquare of dh will be every where equal to the ſquare of kc (the radius of the ſphere) the ſquare $hc=eh$ ſquare; and conſequently, ſince circles are to one another as the ſquares of the radii, all the circles of the hemiſphere will be equal to all thoſe of the cylinder, deducting thence all thoſe of the cone: wherefore the cylinder, deducting the cone, is equal to the hemiſphere: but it is known, that the cone is one third of the cylinder, and conſequently the ſphere muſt be two thirds of it. Q. E. D.

INDORSEMENT, in law, any thing written on the back of a deed, as a receipt for money received.

There is likewiſe an indorſement, by way of aſſignment, on bills of exchange and notes of hand; which is done, by writing a perſon's name on the back thereof. See the article BILL.

INDRAPORE, a dutch ſettlement on the weſt coaſt of Sumatra, in the Eaſt Indies.

INDUCEMENT, in law, ſignifies what may be alledged as a motive; and, in our law, it is uſed ſpecially in ſeveral caſes; as, there is an inducement to actions, to a traverſe in pleading, and to an offence committed, &c. It has been held that a general indebitus is inſufficient, where it is the ground of an action; but where it is only the inducement to it, as in conſideration of forbearing a debt till a certain day, this being a collateral promiſe, is good without

out ſhewing how the debt became due. A perſon ought to induce his traverſe, when he denies the title of another; for this reaſon, becauſe he ſhould not deny it, till he ſhews ſome colourable title in himſelf; and becauſe, if the title traverſed ſhould be found naught, and no colour appear for him who traverſed, in that caſe no judgment can be given.

INDUCTION, in law, is putting a clerk or clergyman in poſſeſſion of a benefice or living to which he is collated, or preſented. See PRESENTATION.

After the biſhop has granted inſtitution, which is a kind of approbation of the choice made of the perſon, he iſſues out his mandate to the archdeacon to induct him; who either does it perſonally, or commiſſions ſome other perſon to do it for him. This is analogous to livery and ſeiſin in temporal eſtates, and puts the clergyman inducted into poſſeſſion of the church, glebe-land, tythes, *&c.*

Induction is performed in the following manner: the clergyman commiſſioned takes the miniſter to be inducted by the hand, lays it upon the key of the church the ring of the door, the latch of the church-gate, or on the church-wall, and pronounces theſe words, "By virtue of "this commiſſion, I induct you into the "real and actual poſſeſſion of the rec- "tory of, *&c.* with all its appurte- "nances." Then he opens the church door, and puts the parſon in poſſeſſion, who commonly tolls a bell, to give notice to the people that he has taken poſſeſſion of the church.

Induction may alſo be made by delivery of a clod or turf of the glebe.

INDUCTION, in logic, a conſequence drawn from principles firſt laid down. See the article CONSEQUENCE.

Thus the concluſion of a ſyllogiſm, is an induction made from the premiſes, See SYLLOGISM, CONCLUSION, *&c.*

Induction is alſo uſed for a kind of ſyllogiſm itſelf, being a medium between an enthymeme and a gradation, in regard it wants a propoſition (which however is underſtood) as in the enthymeme, and abounds in aſſumptions (which yet are collateral, or of the ſame degree) which is the caſe in a gradation. See the articles ENTHYMEME and GRADATION.

There are reckoned three kinds of Induction, 1. That which concludes ſome general propoſition from an enumeration of all the particulars of a kind, which is called dialectic induction. In this way of reaſoning, if one part of the enumeration be wanting, it deſtroys the whole. The ſecond kind proceeds by interrogation, and concludes with a probability: This is called παραγωγή, and was what Socrates ordinarily made uſe of. The third kind of induction is properly rhetorical, being a concluſion drawn from ſome example or authority.

For a full account of that ſpecies of reaſoning called induction, ſee the article REASONING.

INDULGENCES, in the romiſh church, are a remiſſion of the puniſhment due to ſins, granted by the church, and ſuppoſed to ſave the ſinner from purgatory. Clement VI. in his decretal, which is generally received by the church of Rome, declares, that our Saviour has left an infinite treaſure of merits, ariſing from his own ſufferings, beſides thoſe of the bleſſed virgin and the ſaints; and that the paſtors and guides of the church, and more eſpecially the popes, who are the ſovereign diſpoſers of this treaſure, have authority to apply it to the living, by virtue of the keys, and to the dead, by way of ſuffrage, to diſcharge them from their reſpective proportions of puniſhment, by taking juſt ſo much merit out of this general treaſure, as they conceive the debt requires, and offering it to God.

The power of granting indulgences has been greatly abuſed in the church of Rome. It was one of the chief things which the council of Conſtance laid to the charge of John XXIII. in 1415, that he impowered his legates to abſolve penitents from all ſorts of crimes, upon the payment of ſums proportionable to their guilt. Pope Leo X. in order to carry on the magnificent ſtructure of St. Peter's at Rome, publiſhed indulgences, and a plenary remiſſion to all ſuch as ſhould contribute money towards it. Finding the project take, he gave his ſiſter, the princeſs of Cibo, the benefit of the indulgencies of Saxony, and the neighbouring parts, and farmed out thoſe of other countries to the higheſt bidders, who, to make the beſt of their bargains, procured the ableſt preachers to cry up the value of the ware. "Happy times for ſinners! ſays a modern "writer, their crimes were rated, and "the remiſſion of them ſet up by auc- "tion. The apoſtolic chancery taxed "ſins at a pretty reaſonable rate. It coſt "but ninety livres, and a few ducats,

"for

"for crimes which people on this side "the Alps punished with death."

It was this great abuse of indulgences that contributed not a little to the first reformation of religion in Germany, where Martin Luther began first to declaim against the preachers of indulgences, and afterwards against indulgences themselves: but since that time the popes have been more sparing in the exercise of this power: however, they still carry on a great trade with them to the Indies, where they are purchased at two reals a piece, and sometimes more.

The pope likewise grants indulgences to persons at the point of death, that is, he grants them, by a brief, power to choose what confessor they please, who is authorized thereby to absolve them from all their sins in general.

INDULT, in the church of Rome, the power of presenting to benefices granted to certain persons by the pope. Of this kind is the indult of kings and sovereign princes, in the romish communion, and that of the parliament of Paris granted by several popes. By the concordat for the abolition of the pragmatic sanction, made between Francis I. and Leo X. in 1516, the french king has the power of nominating to bishoprics, and other consistorial benefices, within his realm. At the same time, by a particular bull, the pope granted him the privilege of nominating to the churches of Britany and Provence. In 1648, pope Alexander VIII. and in 1668, Clement IX. granted the king an indult for the bishoprics of Metz, Toul, and Verdun, which had been yielded to him by the treaty of Munster; and in 1668, the same pope Clement IX. granted him an indult for the benefices in the counties of Rousillon, Artois, and the Netherlands. The cardinals likewise have an indult granted them by agreement between pope Paul IV. and the sacred college in 1555, which is always confirmed by the popes at the time of their election. By this treaty the cardinals have the free disposal of all the benefices depending on them, and are impowered likewise to bestow a benefice in commendam.

INDULTO, a duty, tax, or custom paid to the king of Spain, for all such commodities as are imported from the West-Indies in the gallions. See GALLION.

INDUS, a large river of Asia, which rises in the mountains which separate Tartary from India, and discharges itself into the Indian ocean.

INERTIA *of matter*, in philosophy, is defined by Sir Isaac Newton to be a passive principle by which bodies persist in their motion or rest, receive motion in proportion to the force impressing it, and resist as much as they are resisted. It is also defined by the same author to be a power implanted in all matter, whereby it resists any change endeavoured to be made in its state.

This power then coincides with the vis resistendi, or power of resisting, whereby every body endeavours, as much as it can, to persevere in its own state, whether of rest or uniform rectilinear motion; which power is still proportionable to the quantity of matter in any body: for since natural bodies consist of a mass of matter, that, of itself is not able to induce any change in its state, if bodies were once at rest, it is necessary that they should always remain in that state of rest, unless there is applied a new force to produce motion in them: but if they were in motion, the same energy of force would always preserve the motion; and therefore bodies would always retain their motion, and would always proceed forward in the same right line with the same tenour, since they cannot of themselves acquire either rest or a retardation, or a change of their direction to turn on one side or the other.

There are some philosophers who readily enough acknowledge, that no body can move of itself, that is, pass from rest to motion of itself; but then they are not as willing to grant, that bodies once moved cannot of themselves arrive at rest, by reason they see the motions of projectiles languish by degrees, and at last the moving bodies themselves come to rest. See PROJECTILES.

But as no mode or accident can of its own accord, or by itself, be destroyed, and as all effects produced by transient causes do remain always, unless there be some new and extraneous cause that destroys them; so likewise motion once commenced, will be continued always, unless it be hindered by some external cause: nor is it more in the power of a body once moved, to lay aside its motion or energy to move, and return of itself to rest, than it can put off the figure that it has been once formed into, and ac-

quire a new one, without fome extrinfic caufe. Therefore, as there is in all bodies a certain force, or rather inactivity, whereby they oppofe every change; from which caufe it proceeds, that they are very difficultly put out of their ftate, whatever it is: but that inactivity is the fame in moving bodies as thofe at reft, nor do bodies lefs refift the action, whereby they are brought from motion to reft, than that whereby they pafs from reft to motion; that is, there is not required a lefs force to put a ftop to the motion of any body, than was before neceffary to imprefs that motion on the fame body. Whence fince the vis inertiæ, or inactivity of matter, always equally refifts equal changes, it will not be lefs powerful to continue a body in motion, which has begun to move, than to preferve a quiefcent body in the fame ftate of reft.

There are fome philofophers who fuppofe body of its own nature to be as indifferent to motion as to reft; but by this indifference they do not, we fuppofe, mean fuch a difpofition in bodies, whereby they do not in the leaft refift reft or motion: for on this fuppofition it would follow, that any body, however great, and moved with the fwifteft velocity, might be ftopped by any the fmalleft force; or if the great body was at reft, it might by moved by any body, however fmall, without the leaft lofs of velocity in the impelling body: that is, any fmall body impinging on a greater one, would carry that greater body along with it, without the leaft lofs of its motion; and each body after the impulfe, would be jointly carried along with that celerity that the fmall body had at firft, which we all know is abfurd. This indifference, therefore, is not placed in a non-refiftance to motion from a ftate of reft, or to reft from a ftate of motion; but in this only, that a body of its own nature is not more propenfe to motion than to reft, nor more refifts to pafs from a ftate of reft to motion than to return again from that motion to the fame ftate of reft: befides, any quiefcent body may be moved by any force; and an equal force, acting in a contrary direction, will be able to deftroy that motion; and in this, this indifference confifts.

Since, according to this law, a body once in motion always continues in that motion, the philofophers afk, Why all projectiles lofe by degrees their motion? Why do they not proceed in infinitum? If motion did not of its own nature decay, a ftone thrown at the beginning of the world, would by this time have gone through an immenfe and almoft infinite fpace. And fo indeed it would, if its motion had been in vacuo, or in free fpaces, and without any gravity. But fince all projectiles are carried either thro' the air, or on the rough furfaces of other bodies, they muft be neceffarily retarded: for fince all bodies in motion muft drive and thruft out of its place the refifting air, or overcome the roughnefs of the fuperficies upon which they are moved, they will lofe all that force and motion that is conftantly employed in overcoming thefe obftacles, and confequently the motion of projectiles will be continually diminifhed: but if there was no refiftance in the medium, no roughnefs in the fuperficies on which they were moved, no gravity that continually forces the bodies towards the earth, motion would always continue the fame, without any retardation at all. So in the heavens, where the medium is exceedingly rare, the planets do continue their motions for a very long time; and upon ice, or any other very fmooth furface without any roughnefs, heavy bodies in motion are not foon brought to reft.

INFALLIBLE, fomething that cannot err, or be deceived. See ERROUR.

One of the great controverfies between the proteftants and papifts, is the infallibility which the latter attribute to the pope; though, in fact, they themfelves are not agreed on that head, fome placing this pretended infallibility in the pope and a general council. See the articles COUNCIL and POPE.

INFAMY, in law, is a term which extends to forgery, perjury, grofs cheats, *&c.* by which a perfon is rendered incapable of being a witnefs or juror, even tho' he is pardoned for his crimes. See the articles FORGERY, PERJURY, *&c.*

INFANT, *infans*, in medicine, denotes a young child. See the article CHILD and DELIVERY.

It being a matter of great importance how tender infants are treated, we fhall lay down fome rules for the direction of the diet, regimen, and other non-naturals, as well with regard to the infant as the nurfe.

As foon, therefore, as the child is brought into the world, it ought, immediately after the ligature and cutting off the umbilical

bilical veſſels, to be waſhed in a warm bath, prepared of water alone, or a mixture of wine and water. The midwife too ſhould be allowed a convenient place and time to examine the child, and ſet to rights any parts that may be ill-formed by the birth. She ſhould likewiſe ſtroke the belly with the hollow of her hand, in order to excite a diſcharge of the fæces. If the new-born infant is found to be weakly, it ſhould be refreſhed by waſhing it with warm wine, rubbing it gently, anointing the breaſt, back, and crown of the head with ſome analeptic ſpirits; or by breathing ſtrongly into its mouth, after chewing cloves and other aromatics; or giving it a ſmall quantity of rheniſh wine, or cinnamon-water. Great caution is alſo neceſſary in ſwadling the infant, leſt out of negligence or ignorance, it receive any injury by this means: for beſides that infants frequently become bump-backed from too great a ſtricture of the breaſt by bandage, by thus obſtructing the circulation, they fall into a conſumption, and are ſubject to ruptures and many other diſorders.

The next care is, that infants, who for want of a diſcharge by ſtool in the mother's womb, always come into the world with their inteſtines replete with excrements, be ſeaſonably purged. But in caſe the weak nature of the infant ſhould not be ſufficient of itſelf, providence has kindly furniſhed the mother at firſt with thin ſerous milk, whoſe deterging and diluting quality opens the body much better and with greater ſafety than the moſt ſelect evacuants, and no danger is to be dreaded from it, unleſs that milky liquor flows from an impure ſpring; or the mother, from the difficulty of the birth, be agitated by convulſive motions; or unleſs any other circumſtances concur which forbid the uſe of a medicine elaborated by nature in the breaſts of women: in which caſe, if the infant has not a ſtool within twenty-four hours, it may be proper to give it a very ſmall quantity of ſolutive ſyrup of roſes, or a clyſter of whey and honey.

As to a proper diet, milk deſervedly conſtitutes the principal, and the univerſal aliment; becauſe it ſupplies both meat and drink at the ſame time, is grateful to the ſtomach, and for this purpoſe it was wiſely ordered by the Creator, that women, immediately after their delivery, ſhould accumulate a ſufficient quantity of it in their breaſts. As infants are nouriſhed by the breaſts either of the mother or a hired nurſe, it is certainly the duty of parents, and thoſe entruſted with the health of children, to take care that they generate pure and temperate milk. This is beſt obtained by their obſerving an exact method of diet, and avoiding all thoſe things which communicate any taſte to the milk, even imperceptible to the ſenſes, and eſpecially ſuch as are capable of producing diſtempers. Particularly let the nurſe, if there be a neceſſity for one, be healthy, in the flower of her age, from twenty to thirty, rather lean than fat, of good morals, compoſed in mind, neither melancholy, paſſionate, nor a drunkard; nor let her milk be too ſtale; but her diet be regular, and great care muſt be taken that ſhe does not all at once paſs from a hard and ſparing diet, to one that is delicate and plentiful. But nothing leſs than an abſolute neceſſity ſhould prevail on a mother to ſuffer her tender progeny to be delivered up to a mercenary nurſe; ſince this is a barbarity exceeding every thing to be met with in the brute creation: for not only all the diſorders incident to the body, but even thoſe of the mind itſelf, are communicated to the ſucking child.

It often happens that the milk is corrupted by various ſudden cauſes, by which either the mother or the nurſe may be affected: and here precautions are neceſſary to prevent impending danger: the milk is extremely vitiated by the terror of the woman who gives ſuck; and conſequently the beſt preſervative againſt the injury ariſing from it, is not to give the breaſt immediately after a fright. The ſame holds true with reſpect to anger; and ſince the injury done to the milk by violent paſſions, upon its long continuance in the breaſts, endangers both the child and the nurſe, to prevent this, the milk ſhould be ſeaſonably extracted.

It ſometimes happens that either the infant is incapable of ſucking the milk out of the breaſts, or the nurſe, from illneſs, or ſome other cauſe, is incapable of affording it: In this caſe, other proper aliments are to be provided, among which are ſweet whey, barley-broth, water-gruel, emulſions of almonds, barley boiled to the conſiſtence of a pulp, with the addition of the yolk of an egg; ſeveral kinds of pap, made of flour, or

crumbs of bread boiled in water, given with or without milk: but chewing victuals and giving it to a child, ought by no means to be allowed; becauſe by ſuch maſtication not only the moſt ſubtle part of the pap is ſucked out, but any infection of the ſaliva and corrupted teeth are eaſily communicated to infants. When children arrive at ſuch an habit as to be capable of digeſting other aliments, care ſhould be taken not to give them food of a hard conſiſtence; they ought not to eat ſalt meat in great quantities, unripe fruit, bread not duly fermented, or too new; nor ought they to eat much of any kind of ſweet meats.

As to the prevention of the diſeaſes in infants, nothing is more uſeful both for the nurſe and the child, than infuſions of ſuch herbs as ſweeten the blood, made in water: and here an infuſion of betony, root of liquorice, fennel-ſeed, and the like, are highly proper. Nor do they act amiſs who ſometimes, after a meal, eat a quantity of fennel or anniſe-feed, which increaſes the milk, and prevents gripes in the infant.

Since milk ſtagnating in the ſtomach and duodenum ſoon grows acid and coagulated, and thus excites a thouſand dangerous ſymptoms, the greateſt care ought to be taken to prevent what is attended with ſuch dangerous conſequences; for which purpoſe thoſe powders are extremely efficacous which contain crabs-eyes, egg-ſhells, the root of florentine orris, ſaffron, the ſeeds or oil of anniſe, *&c.* of which a doſe may be given twice or three times a week. And ſince the health of infants greatly depends upon a due and ſufficient diſcharge of the excrements by ſtool, and the preſervation of the tone of the ſtomach and inteſtines, gentle laxatives, if neceſſary, ſhould be ſometimes interpoſed; but ſtrong and acrid purges, as reſin of jalap, ſcammony, black hellebore and the like, are improper and pernicious. They ought not to take aloes on account of the heat it occaſions, nor the leaves of ſenna becauſe of the coſtivenefs it produces: nor are theſe prejudicial only when given to children, but alſo when given to the nurſes; for being mixed with the milk, they often throw the tender infants into convulſions. Sydenham rightly obſerves, that children, in the firſt month, are often ſeized with the epilepſy from too frequent ſtools; and Galen juſtly aſſerted, that the bodies of children ought not to be exſiccated with purgatives, which would prevent their growing. And, really, it is inexpreſſible how much the tender and weak ſtomachs of new born infants are prejudiced by purgatives.

Diſeaſes of INFANTS may be reduced to the following heads. 1. Retention of the meconium, or firſt ſtools, already taken notice of. 2. Aphthæ, or thruſh, which affect the whole mouth, and even inteſtines: for this Heiſter adviſes a grain or two of mercurius dulcis, given in two drams of ſolutive ſyrup of roſes: he would have the nurſe, likewiſe, take rhubarb, and the abſorbent powders; and externally, Shaw would have the ulcers touched frequently with a mixture of honey of roſes, and oil of vitriol. 3. Chaffing, or galling, of the fleſh, already treated of under the article EXCORIATION. 4. Coſtiveneſs, for which Heiſter recommends two or three grains of rhubarb in ſolutive ſyrup of roſes, or a ſolution of manna, till the child's belly is opened; and afterwards the teſtaceous powders. 5. Coughs of infants ſeldom prove obſtinate, uſually giving way to pectoral ſyrups, or a little ſpermaceti; relaxing the bowels at the ſame time with rhubarb, given in ſolutive ſyrup of roſes. In very bad caſes, a few drops of ſpirit of ſal-armoniac, given pretty often, has a very good effect; and if the child be almoſt choaked, a quarter of a grain of tartar emetic, taken as a vomit, will ſnatch it from the jaws of death. Oil of ſweet almonds is likewiſe very good; as are flowers of ſulphur, in phlegmatic habits. 6. Cruſta Lactea, or ſcabby eruptions, otherwiſe called achores, already treated of under the articles ACHOR and CRUSTA. 7. Atrophy, or conſumption, for the cure of which the crudities of the bowels ſhould be evacuated by gentle laxatives, now and then repeated, to which a few grains of mercurius dulcis muſt always be added; or even the purgative ſalts may be preſcribed. Externally, baths of ſoft-water, with aromatic herbs, with friction of the joints while in the bath, and frequent motion, are recommended. 8. Convulſion, if owing to acrimonious humours in the bowels, is cured by gentle doſes of ſyrup of rhubarb, with the abſorbent powders; but when epileptic, cinnabar is to be given freely in powders; and when owing to worms, mercurius dulcis is the beſt of all medicines. 9. Diarrhœa of infants is already treated of under its proper article. 10. Stoppage of

of the nofe fometimes happens, infomuch that they can fcarce breathe, fuck, or fwallow; for the cure of which, after a fuitable purge, diffolve two or three grains of white vitriol in half an ounce of marjoram water; then filtre it, and apply it now and then to the noftrils with a linen-rag. Or you may apply oil of fweet almonds, impregnated with oil of marjoram, to the bottom and fides of the noftrils, which will refolve the filth. 11. Running of the eyes and ears is a very common complaint, which is cured by fmall dofes of the decoction of pimpernel-root, faffafras, and gentle laxatives, in which a grain or two of calomel is mixed. 12. Vomiting is rather accounted falutary than otherwife; but when too violent, it may be remedied by gentle clyfters. 13. Suppreffion of urine is cured by giving half a fcruple of fome neutral falt, as vitriolated tartar, arcanum duplicatum, and the like; but if thefe fail, a catheter muft be introduced into the bladder, which is much eafier in girls than boys. 14. Fevers of children, fee FEVER. 15. Difficulty of teething, fee DENTITION. 16. Imperforations of the neceffary parts, fo that there is no paffage for the ftools or urine; in which the affiftance of the furgeon muft be fpeedily called in, or the infant is loft. 17. Jaundice, or a yellownefs of the fkin, fee JAUNDICE. 18. Worms in children, fee WORMS. 19. Rickets feldom attack children before they are nine months old, fee RICKETS. 20. Gripes and other diforders of the bowels, are generally owing to corrupted milk; the cure of which confifts in the ufe of antiacids, mild cathartics, and clyfters of the fame intention, with gentle carminatives. Sometimes, indeed, the gripes are fo violent as not to be cured without two drops of the thebaic tincture in a little fyrup of rofes. Abforbents are alfo deemed excellent in thefe diforders, as they cure the gripes, reftleffnefs, and watching in infants, as certainly as opium eafes pain in adults.

Hare-Lip in INFANTS. See LIP.

INFANT, in law, fignifies a perfon under the age of one and twenty.

An infant may bind himfelf apprentice, and if he ferve feven years, may have the benefit of his trade; but if he be guilty of mifbehaviour, the mafter may give him gentle correction, or complain to a juftice of peace and have him punifhed. He may alfo bind himfelf for the payment of neceffaries, fuch as meat, drink, wafhing, apparel and learning, though not by bond with a penalty: infants are not obliged to pay for cloaths, unlefs it be proved that they were for their own wearing, and convenient and neceffary for them to wear according to their degree and eftate; and though an infant may buy neceffaries, he cannot borrow money to do it; for the law will not truft him with money, except at the peril of the lender, who muft either fee it thus laid out, or take care to lay it out himfelf in fuch neceffaries. If an infant is the defendant in an action, the plaintiff has fix years to commence his action in after the infant comes of age; and an infant who is a plaintiff, has alfo fix years, after he comes of age, to fue, by the ftatute of limitations. If an infant grants leafes for a term of years, he may, at his full age, either confirm the leafe, or bring trefpafs againft the leffee for the occupation. Alfo a leafe granted to an infant may be avoided by waving the land before the rent day expreffed therein. An infant may purchafe lands, where fuch purchafe is intended for his benefit, tho' at his full age he may either avoid or confirm fuch purchafe; and, in cafe an infant fell lands by deeds indented and inrolled, he may avoid the fame. However, infants are bound by all acts of neceffity, as in prefentations to benefices, admittances and grants of copyhold eftates, affenting to legacies, and conditions annexed to lands, whether an eftate comes by grant or by defcent.

INFANTE and INFANTA, all the fons and daughters of the kings of Spain and Portugal, except the eldeft; the princes being called infantes, and the princeffes infantas.

INFANTRY, in military affairs, denotes the whole body of foot-foldiers. See the article SOLDIER.

INFECTION, among phyficians, the fame with contagion. See CONTAGION.

INFERENCE, in matters of literature, a corollary, conclufion, argument, or induction drawn from fomething that went before. See CONCLUSION, &c.

INFERNAL-STONE, *lapis infernalis*. See the article LAPIS.

INFINITE, that which has neither beginning nor end: in which fenfe God alone is infinite. See the article GOD.

Infinite is alfo ufed to fignify that which has had a beginning, but will have no end, as angels and human fouls. Th[illegible]

make

makes what the ſchoolmen call *infinitum a parte poſt*; as, on the contrary, by *infinitum a parte ante*, they mean that which has an end but had no beginning.

INFINITE, or INFINITELY GREAT LINE, in geometry, denotes only an indefinite or indeterminate line, to which no certain bounds, or limits, are preſcribed.

INFINITE QUANTITIES. The very idea of magnitudes infinitely great, or ſuch as exceed any aſſignable quantities, does include a negation of limits: yet if we nearly examine this notion, we ſhall find that ſuch magnitudes are not equal among themſelves, but that there are really beſides infinite length and infinite area, three ſeveral ſorts of infinite ſolidity; all of which are *quantitates ſui generis*, and that thoſe of each ſpecies are in given proportions.

Infinite length, or a line infinitely long, is to be conſidered either as beginning at a point, and ſo infinitely extended one way, or elſe both ways from the ſame point; in which caſe the one, which is a beginning infinity, is the one half of the whole, which is the ſum of the beginning and ceaſing infinity; or, as may be ſaid, of infinity *a parte ante* and *a parte poſt*, which is analogous to eternity in time, and duration, in which there is always as much to follow as is paſt, from any point or moment of time: nor doth the addition or ſubduction of finite length, or ſpace of time, alter the caſe either in infinity or eternity, ſince both the one or the other cannot be any part of the whole.

As to infinite ſurface, or area, any right line, infinitely extended both ways on an infinite plane, does divide that infinite plane into equal parts, the one to the right, and the other to the left of the ſaid line; but if from any point, in ſuch a plane, two right lines be infinitely extended, ſo as to make an angle, the infinite area, intercepted between thoſe infinite right lines, is to the whole infinite plane as the arch of a circle, on the point of concourſe of thoſe lines as a center, intercepted between the ſaid lines, is to the circumference of the circle; or, as the degrees of the angle to the 360 degrees of a circle: for example, right lines meeting at a right angle do include, on an infinite plane, a quarter part of the whole infinite area of ſuch a plane.

But if two parallel infinite lines be ſuppoſed drawn on ſuch an infinite plane, the area intercepted between them will be likewiſe infinite; but at the ſame time will be infinitely leſs than that ſpace, which is intercepted between two infinite lines that are inclined, though with never ſo ſmall an angle; for that, in the one caſe, the given finite diſtance of the parallel lines diminiſhes the infinity in one degree of dimenſion; whereas, in a ſector there is infinity in both dimenſions: and conſequently the quantities are the one infinitely greater than the other, and there is no proportion between them.

From the ſame conſideration ariſe the three ſeveral ſpecies of infinite ſpace or ſolidity; for a parallelopiped, or a cylinder, infinitely long, is greater than any finite magnitude, how great ſoever; and all ſuch ſolids, ſuppoſed to be formed on given baſes, are as thoſe baſes in proportion to one another. But if two of theſe three dimenſions are wanting, as in the ſpace intercepted between two parallel planes infinitely extended, and at a finite diſtance, or with infinite length and breadth, with a finite thickneſs, all ſuch ſolids ſhall be as the given finite diſtances one to another; but theſe quantities, though infinitely greater than the other, are yet infinitely leſs than any of thoſe wherein all the three dimenſions are infinite. Such are the ſpaces intercepted between two inclined planes infinitely extended; the ſpace intercepted by the ſurface of a cone, or the ſides of a pyramid, likewiſe infinitely continued, &c. of all which notwithſtanding, the proportions one to another, and to the τὸ πᾶν, or vaſt abyſs of infinite ſpace (wherein is the locus of all things that are or can be; or to the ſolid of infinite length, breadth and thickneſs taken all manner of ways) are eaſily aſſignable; for the ſpace between two planes is to the whole as the angle of thoſe planes to the 360 degrees of the circle. As for cones and pyramids, they are as the ſpherical ſurface intercepted by them is to the ſurface of the ſphere, and therefore cones are as the verſed ſines of half their angles to the diameter of the circle: theſe three ſorts of infinite quantity are analogous to a line, ſurface, and ſolid; and, after the ſame manner, cannot be compared, or have no proportion the one to the other.

INFINITESIMALS, among mathematicians, are defined to be infinitely ſmall quantities.

In the method of infiniteſimals, the element, by which any quantity increaſes or decreaſes, is ſuppoſed to be infinitely ſmall, and is generally expreſſed by two or

or more terms, some of which are infinitely less than the rest, which being neglected as of no importance, the remaining terms form what is called the difference of the proposed quantity. The terms that are neglected in this manner, as infinitely less than the other terms of the element, are the very same which arise in consequence of the acceleration, or retardation, of the generating motion, during the infinitely small time in which the element is generated; so that the remaining terms express the elements that would have been produced in that time, if the generating motion had continued uniform: therefore those differences are accurately in the same ratio to each other as the generating motions or fluxions. And hence, though in this method infinitesimal parts of the elements are neglected, the conclusions are accurately true without even an infinitely small error, and agree precisely with those that are deduced by the method by fluxions.

For example, (pl. CXLVI. fig. 1. n° 1.) when DG, the increment of the base AD, of the triangle ADE, is supposed to become infinitely little, the trapezium DGHE (the simultaneous increment of the triangle) consists of two parts, the parallelogram EG, and the triangle EIH; the latter of which is infinitely less than the former, their ratio being that of one half DG to AD: therefore, according to this method in fluxions, the part EIH is neglected, and the remaining part, viz. the parallelogram EG is the difference of the triangle ADE. Now it was shewn, (see the article FLUXIONS,) that EG is precisely that part of the increment of the triangle ADE which is generated by the motion with which this triangle flows, and that EIH is the part of the same increment which is generated in consequence of the acceleration of this motion, while the base, by flowing uniformly, acquires the augment DG, whether DG be supposed finite or infinitely little.

Example 2. The increment DELMHG (*ibid.* n° 2.) of the rectangle AE, consists of the parallelograms EG, EM, and I*b*; the last of which, I*b*, becomes infinitely less than EG or EM, when DG and LM, the increments of the sides, are supposed infinitely small; because I*b* is supposed to EG as LM to AL, and to EM as DG to AD; therefore, I*b* being neglected, the sum of the parallelograms EG and EM is the difference of the rectangle AE: and the sum of EG and EM is the space that would have been generated by the motion with which the rectangle AE flows continued uniformly, but that I*b* is the part of the increment of the rectangle which is generated in consequence of the acceleration of this motion, in the time that AD and AL, by flowing uniformly, acquire the augments DG and LM. The same may be observed in propositions wherein the fluxions of quantities are determined; and thus the manner of investigating the differences, or fluxions of quantities, in the method of infinitesimals, may be deduced from the principles of the method of fluxions. For instead of neglecting EIH because it is infinitely less than EG, n° 1. (according to the usual manner of reasoning in that method) we may reject it; because we may thence conclude, that it is not produced in consequence of the generating motion DG, but of the subsequent variations of this motion. And it appears why the conclusions in the method of infinitesimals are not to be represented as if they were only near the truth, but are to be held as accurately true.

In order to render the application of this method easy, some analogous principles are admitted, as that the infinitely small elements of a curve are right lines, or that a curve is a polygon of an infinite number of sides, which being produced, give the tangents of the curve; and by their inclination to each other measure the curvature. This is as if we should suppose, when the base flows uniformly, the ordinate flows with a motion which is uniform for every infinitely small part of time, and increases or decreases by infinitely small differences at the end of every such time.

But however convenient this principle may be, it must be applied with caution and art on various occasions. It is usual therefore, in many cases, to resolve the element of the curve into two or more infinitely small right lines; and sometimes it is necessary, if we would avoid error, to resolve it into an infinite number of such right lines, which are infinitesimals of the second order. In general, it is a postulatum in this method, that we may descend to the infinitesimals of any order whatever, as we find it necessary; by which means, any error that might arise in the application of it may be discovered and

Fig. 1. INFINITESIMALS.

Fig. 2. INFLECTION

Fig. 3. INTESTINES.


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and corrected by a proper use of this method itself. For an example of this, see Maclaurin's Fluxions, article 498.

It is likewise to be observed, when the value of a quantity that is required in a philosophical problem becomes, in certain particular cases, infinitely great or infinitely little, the solution would not be always just though such magnitudes were admitted. As when it is required to find by what centripetal force a curve could be described about a fixed point that is either in the curve, or is so situated, that a tangent may be drawn from it to the curve, the value of the force is found infinite at the center of the forces in the former case, and at the point of contact in the latter; yet it is obvious, that an infinite force could not inflect the line described by a body that should proceed from either of these points, into a curve; because the direction of its motion in either case passes thro' the center of the forces, and no force, how great soever, that tends towards the center could cause it to change that direction. But it is to be observed, that the geometrical magnitude by which the force is measured, is no more imaginary in this than in other cases, where it becomes infinite; and philosophical problems have limitations that enter not always into the general solution given by geometry.

But to obviate these scruples, which the brief manner of proceeding in the method of infinitesimals is apt to suggest to such as enter on the higher parts of geometry, after having been accustomed to a more strict and rigid kind of demonstration in the elementary parts. To such it may seem not to be consistent with the perfect accuracy that is required in geometrical demonstration, that, in determining the first differences, any part of the element of the variable quantity should be rejected, merely because it is infinitely less than the rest, and that the same part should be afterwards employed for determining the second and higher differences, and resolving some of the most important problems. Nor can we suppose that their scruples will be removed, but rather confirmed, when they come to consider what has been advanced by some of the most celebrated writers on this method, who have expressed their sentiments concerning infinitely small quantities in the precisest terms; while some of them deny their reality, and consider them only as incomparably less than finite quantities, in the same manner as a grain of sand is incomparably less than the whole earth; and others represent them, in all their orders, as no less real than finite quantities. From what has been said, it will appear that a satisfactory account may be given for the more brief way of reasoning used in the method of infinitesimals; and that then we investigate the first differences, we may reject the infinitesimal part of the element, not merely because they are infinitely less than the other parts; but because the quantities generated, and their mutual relations, depend upon the generating motions, and are discovered by them. The same infinitesimal parts of the element, however, may serve for measuring the acceleration or retardation of those motions from that term, or the powers which may be conceived to accelerate or retard them at that term: and here the infinitely small parts of the element that are of the third order, are neglected for a similar reason, being generated only in consequence of the variation of those powers from that term of the time. In this manner we presume some satisfaction may be given to the scrupulous (who may be apt to demur at the usual way of reasoning in this method) while nothing is neglected without accounting for it; and thus the harmony may appear to be more perfect betwixt the method of fluxions and that of infinitesimals.

But, however safe and convenient this method may be, some will always scruple to admit infinitely little quantities, and infinite orders of infinitesimals, into a science that boasts of the most evident and accurate principles, as well as of the most rigid demonstrations; and therefore in this article, more unexceptionable postulata have been used. In order to avoid such suppositions, Sir Isaac Newton considers the simultaneous increments of the flowing quantities as finite, and then investigates the ratio, which is the limit of the various proportions, which those increments bear to each other, while he supposes them to decrease together, till they vanish; which ratio is the same with the ratio of fluxions.

INFIRMARY, a kind of hospital, where the weak and sickly are properly taken care of. See HOSPITAL.

INFLAMMABILITY, that property of bodies, which disposes them to kindle, or catch fire. See the articles FIRE, FLAME, HEAT, &c.

Accord-

According to Dr. Shaw, the oil, contained in bodies, is the ſole principle of their inflammability. See FUEL.

From many experiments Boerhaave found, that all thoſe parts of vegetables, which are capable by fire of making a true flame, are eaſily miſcible among each other, when pure, ſimple, and inflammable. Thus alcohol, which is the only known body perfectly inflammable, however prepared, provided it be pure, may be intimately mixed with any other alcohol prepared in any other manner, without the leaſt alteration thence ariſing. So alſo all pure oils, when rightly purged of other parts, will mix thoroughly with each other. Nay, all the pureſt oils, and even alcohol itſelf, may be ſo accurately mixed together, as to form one homogeneous fluid, in which the beſt microſcopes ſhall not be able to diſcern the leaſt diverſity of parts; which, however, is to be underſtood with this reſtriction, that there be not the ſmalleſt drop of water in ſuch oil or alcohol. So alſo camphor, which may be reckoned among the vegetable ſolids, burns wholly away, diſſolves and mixes intimately, not only in alcohol, but in any pure oil: and the like holds of other perfectly inflammable vegetables, which mix in oils or alcohol the more thoroughly, as they are more entirely inflammable. The ſame holds of reſins, balſams, and gum-reſins, which, when mixed under the conditions above ſpecified, may be liquified even by a ſmall degree of heat, or even run ſpontaneouſly. Nor muſt it be omitted, that all perfectly inflammable bodies contain certain viſcid parts, which produce a briſk coheſion; and that many of them are incapable of being frozen by any degree of cold hitherto known, as appears in linſeed oil. See COLD, FROST, FREEZING, OIL, and ALCOHOL.

But what appears moſt wonderful in regard to the inflammability of bodies, is the production of actual flame by the mixture of two cold liquors. The mixture which moſt conſtantly and happily produces this effect, is oil of turpentine with an aqua fortis, made in the following manner: take two pounds of dried and powdered nitre, which mix with one pound of concentrated oil of vitriol, or of common oil of vitriol of a ſufficient ſtrength: diſtil this mixture in a retort with a reverberatory fire, and the liquor thereby raiſed will be an aqua fortis, capable of producing fire and flame with oil of turpentine without any farther aſſiſtance. But without being at the trouble of making an aqua fortis on purpoſe, if well dephlegmated ſpirit of nitre be mixed with a ſufficient quantity of well rectified oil of vitriol, this mixture will give fire very readily with oil of turpentine, or any other aromatic oil. The proportions are an ounce of the ſpirit of nitre, half an ounce of the oil of vitriol, and an ounce of oil of turpentine; tho' Mr. Geoffroy tells us, he has ſucceeded very well with a dram of ſpirit of nitre, a dram of oil of vitriol, and three drams of oil of turpentine. This experiment, performed with turpentine inſtead of its oil, is extremely diverting, as the flame not only continues longer, but there are a great many ſucceſſive exploſions.

INFLAMMATION, in ſurgery and medicine, is defined to be a preſſure and attrition of the red arterial blood, ſtagnating in the ſmalleſt canals, produced by the motion of the reſt of the blood, thrown into a violent and forcible commotion, by means of a fever. See the article FEVER.

This definition of an inflammation is taken from its cauſes. Others define it from its ſymptoms to be a ſpecies of tumour attended with a burning heat, pain, redneſs, reſiſtance, and a continual pulſation and pricking. See TUMOUR.

Inflammations are either external, being ſuch as fall properly under the buſineſs of ſurgery, and are cured by manual operations and topical remedies; or internal, being ſuch whoſe cure is to be expected chiefly from the uſe of internal remedies.

General diviſion of external INFLAMMATIONS. External inflammations, ſeated in the common integuments, are generally termed phlegmons but when ſlighter, they are called furuncles. The inflammation which is not fixed deep, but only ſpreads ſuperficially on the ſkin, is uſually diſtinguiſhed by the name of an eryſipelas; and the inflammatory tumour that ariſes at the finger-ends, is termed paronychia; when the inflammation fixes in the groin or armpits, the tumour is called a bubo; when under the ears, parotis. If an inflammation ſeizes the hands and feet from extreme cold, chilblains ariſe: other inflammations have alſo particular names, according to the particular part of the body they poſſeſs.

 General

General causes of external INFLAMMATIONS. The cause of a phlegmon, or an external inflammation, arises generally from too thick or viscid a state of the blood, stagnating in the anastomoses of the smallest arteries and veins; so that the blood being sent in larger quantities than it can pass through those vessels, must of consequence excite the fore-mentioned general symptoms of an inflammation, and must occasion great disorders at every part where such stagnation is made. And tho' no part of the body, whether external or internal, nor the bones themselves are exempt from this kind of inflammation, yet it more frequently happens in the fat and glands than any where else.

With regard to the cause whence that inspissation and stagnation in those vessels proceeds, they are, according to Heister, of two kinds, of which the first may be called external, and the latter internal. Among the external causes are placed in the first rank all wounds, fractures, luxations contusions, punctures by thorns and splinters, with a too great compression of the vessels, whether by too strict a bandage, or otherwise. To these causes may be added burns of all sorts, extreme cold, too violent a motion of the body, the external or internal application of too sharp and stimulating substances, sticking plasters, oily and fat things, with abundance of the like nature, which stop up the pores of the skin, and impede the free course of the blood. Amongst the internal causes, the same author reckons any thing acrimonious in the fluids, as in the scurvy; as also from the blood's abounding in too great quantities, or being of too thick a consistence; or lastly, when it circulates in the body with too violent a motion: for by this means the grosser particles of the blood are drove, and, as it were, wedged into smaller vessels, than they can readily find a passage through, and this, more especially, when a sudden cold is spread over a body that is in a great heat. In short, every thing will produce an obstruction which makes the parts of the blood too gross and bulky, or too much contracts the mouth of the small vessels.

General crises and cure of INFLAMMATIONS. Inflammations terminate variously, according to their different degrees of violence, the causes from whence they arise, the parts which they affect, and the particular constitution of the patient, with several other circumstances which also presage to us what shall be the end of the inflammation. But the several ways wherein an inflammation terminates are chiefly four. It is either, 1. so dispersed and resolved as to vanish without leaving any considerable injury in the part affected, and which afterwards recovers its former vigour, and is of all others, the best course it can take; or else, 2. the inflammation suppurates, and degenerates into an abscess, so as to leave ever after some damage in the organ; or else, 3. the inflammation degenerates into a gangrene, or sphacelus; or lastly, into a hard tumour, commonly called a scirrhus, which grows more compact in the part affected, as the inflammation remits or goes off.

As to the resolution and dispersion of an inflammation, that is usually practicable, when it is only of a milder kind, in a sound habit of body, when the blood is not yet too viscid nor vehement in its motion; and this treatment we have delivered already under the article DISPERSION.

But suppuration follows, when the inflammation is more violent, the circulation more rapid, but yet the mass of blood somewhat temperate, and without much acrimony: the treatment of an inflammation that terminates in a suppuration, the reader will find delivered under the articles SUPPURATION, ABSCESS, *&c.*

When the forementioned symptoms are much more violent, and when the blood is at the same time more acrimonious and rapid than it ought to be, the inflammation generally terminates in a gangrene, the nature and treatment of which see under the article GANGRENE. But if the inflamed part be full of glands, and the blood very thick, glutinous, and inspissated, the small blood-vessels are then so strongly stuffed up with the glutinous blood, that they are compacted together, the parts lose their sensation, and are converted into a hard tumour, which is thence called a scirrhus. See the article SCIRRHUS.

INFLAMMATION *in the breasts*, a disorder most incident to child-bearing women, and almost constantly happens in a few days after their delivery.

If the milk should be propelled too plentifully and forcibly into the breast, which at such times frequently happens; and if the mother should then be seized with cold,

cold, fear, anger, or a fudden perturbation of mind, the fanguiferous and lactiferous veffels being thence obftructed, the breafts muft then become inevitably tumified, which will be attended with great heat, rednefs, refiftance, and violent pain. The fame accident often happens to women that give fuck even a long time after their lying in, and is fometimes the cafe of thofe who have no milk, all proceeding from the caufes already mentioned; and Heifter gives us an inftance of a man's breaft being inflamed by means of a great fright. Thefe inflammations do not, according to that author, always happen to be equally intenfe and violent; for fometimes it feizes the whole breaft; fometimes only one fide; and at another times occupies only a fmall part of the breaft: fometimes the inflammation lies very near the fkin; at other times very deep; and at one time it has urgent fymptoms, and at another, it fits eafy on the part.

This diforder may be fpeedily removed in women of condition, and fuch as do not fuckle their children, if fome of the plafter of fperma ceti fpread on linen be applied warm all round the breaft foon after parturition; being perforated in the middle, to tranfmit the papilla or nipple; the acceffion of the milk being alfo repelled by a very ftrait bandage. Among the internal remedies, the moft proper are fuch as bring down the lochia puerperarum, when they do not flow in fufficient plenty of themfelves: the principal remedies for this purpofe are the effence of myrrh, amber, the effence of faffron, elixir proprietatis, *&c.* Laftly, with refpect to the proper drink, it muft be carefully obferved to diminifh the quantity of milk by fmalnefs and poverty of the meat and drink, upon which account the patient fhould be recommended to drink fmall broth, tea, or the like watery liquors: and if the mother be defirous of fuckling the infant, there can be no better prefervative againft the inflammations of the breafts. But when the inflammation is fixed the cure muft be attempted either by difperfion or fuppuration, for the methods of which fee DISPERSION and SUPPURATION.

But if it happens that the tumour will neither yield to difperfion nor fuppuration, and is in danger of turning to a fcirrhus, or cancer, the patient muft be kept in good fpirits, and the plafter of fperma ceti be conftantly retained on the tumour, by which means it will probably either grow lefs or elfe vanifh.

For other kinds of external inflammations, fee the articles FURUNCLE, ERYSIPELAS, PARONYCHIA, BUBO, PAROTIS, *&c.*

But internal inflammations, or fuch whofe cure is to be expected chiefly from the ufe of internal remedies, are in particular as follow.

INFLAMMATION *of the bladder*, that attended with an acute, burning, preffing pain, in the region of the pubes, a fever, and a continual tenefmus, or defire of going to ftool, and a perpetual ftriving to make water.

Other fymptoms of this difeafe are a rumbling of the bowels, griping pains, great anxiety of the precordia, difficult breathing, want of appetite, and vomiting, coldnefs of the extreme parts, a hard, quick, unequal, contracted pulfe, inquietude, and fometimes convulfions. There is another kind which is more fuperficial, and is either rheumatic or eryfipetalous, in which the fever is more eafily and fpeedily cured, by promoting a diaphorefis; and perfons in years, who are affected with the fcurvy, gout, rheumatifm, or violent head-achs, are moft fubject to it, efpecially if they catch cold from a north wind. The former arifes commonly from the ftoppage of the menfes, bleeding, piles, or other ufual fanguinary evacuations, and not feldom from a violent gonorrhœa, unfkillfully fuppreffed by aftringents; or when treated by medicines of too fharp and hot a nature.

This difeafe is mortal, if it terminates in an ulcer, or mortification: the latter is immediate death.

The cure muft be attempted, fays Hoffman, with bleeding in the foot, if a fuppreffion of the menfes or hæmorrhoidal flux be the caufe. If it proceeds from the fcurvy, *&c.* recourfe muft be had to gentle diaphoretics, diluents, and remedies which obtund the acrimony of the humours, fuch as decoctions of the root of fcorzonera, china, fkirrets, and fennel. Alfo infufions in the manner of tea of the tops of yarrow, flowers of mallows, winter cherries, and feed of daucus made with milk, and fweetened with fyrup of marfhmallows. To thefe may be added emulfions of the four cold feeds. If the patient is coftive, manna will be proper with antimoniated nitre, to which rhubarb may be joined, as occafion requires.

If the diseafe is violent, diaphoretic powders with nitre, in a larger proportion than ordinary, as alfo five grains of faffron, and two of camphire, with the emulfions aforefaid. Externally antifpafmodics and gentle difcutients will be proper; for which purpofe it was Hoffman's method to apply bladders, filled with a decoction of emollient flowers. If the tenefmus and difficulty of urine arife from fpafms, there is nothing better than the vapours of a decoction in milk in the flowers of melilot, elder, chamomile and mallows, and the tops of yarrow. This decoction may be put into a clofe ftool, and the patient fit over it.

Inflammation *of the brain.* See the article Phrensy.

Inflammation *of the diaphragm.* See the article Paraphrenitis.

Inflammation *of the eyes.* See the article Ophthalmia.

Inflammation *of the fauces.* See the article Quinzy.

Inflammation *of the inteftines*, according to Boerhaave, is an inflammation contracting the inteftines, and ftopping up the paffage thro' them; attended with a vehement fixed, burning pain, which is irritated by things taken inwardly. When the inflammation is in the upper part of the inteftines, the ftomach will be greatly diftended with wind. When the pain is exafperated, it produces convulfions of the diaphragm and abdominal mufcles, vomiting, and painful inflations, with rumblings and fharp griping pains, which may bring on the iliac paffion, or twifting of the guts. Hoffman fays, that when there is a burning pain in the abdomen, with a preternatural heat of the whole body, as alfo a quick pulfe, lofs of ftrength, anxiety and inquietude, the feat of the difeafe may juftly be fufpected to be in the inteftines. If the pain is above the navel, and below the ftomach, attended with a fever, naufea, and reaching, it is a fign that that part of the colon is affected, which lies beneath the ftomach, and is extended from the right to the left fide. If the pain lies in the right hypochondrium, under the fpurious ribs, it fhews that part of the colon to be inflamed where it joins with the ilium. When the complaint is on the left fide, under the loins, where the pfoas mufcle is placed, it is a fign that the colon, and that part of the mefentery joined thereto, is the feat of the difeafe, efpecially when it adheres to the peritonæum: but when the pain is in the middle of the abdomen about the navel, it fhews the fmall guts are certainly affected. In all which cafes the pain is fuppofed to be attended with a fever.

Arbuthnot advifes, that this difeafe be carefully diftinguifhed from a colic, proceeding from a cold caufe, becaufe what is good for the latter is poifon in the former. It muft have a fpeedy remedy, or it will foon, according to that writer, end in the iliac paffion, or a mortification. Befides copious bleeding, he thinks, there is fcarcely any other method of cure than fomenting and relaxing the bowels with emollient liquids taken warm, both by the mouth and in clyfters, and this every hour. Warm fomentations, or young, vigorous, and found animals applied to the body are extremely beneficial.

Boerhaave directs that the patient fhould only be nourifhed with broth, in which gently detergent roots have been boiled. After bleeding and clyfters, if the pain continues violent, Hoffman is of opinion that there will be no manner of danger in giving opiates, by which means the excruciating pain will be alleviated, and the fpafms appeafed, and a breathing fweat will follow. When this is done, and the fever abated, there will be no occafion to continue the dilating, relaxing and moiftening medicines, but rather the nervous and corroborating; fuch as the preparations of amber, efpecially the falt and tincture; the former of which may be given in a bolus from fix to fixteen grains, and the latter from twenty to eighty drops, in any convenient vehicle.

If the patient furvives three days, and the acutenefs of the pain abates, with a chilnefs and fhivering thoroughout the body, it is a fign of a fuppuration, and within fourteen days the impofthume will break, and if it falls into the cavity of the abdomen, it will corrupt the whole mafs of fluids, putrify the vifcera, and turn to an afcites, whence the patient will die of a confumption. In this cafe, Boerhave and Arbuthnot recommend whey and chalybeat waters, as likely to prove moft beneficial. The impofthume may alfo turn either to a gangrene or fcirrhus, both which are mortal.

Inflammation *of the kidneys.* See the article Nephritis.

Inflammation *of the liver.* When the liver

liver is inflamed, it compreſſes the ſtomach, diaphragm, and the neighbouring viſcera of the abdomen ; it ſtops the circulation of the fluids, hinders the generation and excretion of the gall, and all digeſtion ; it produces a great many bad ſymptoms, as the jaundice, with all the diſeaſes depending thereon. See the article HEPATITIS.

A fever, an inflammation, and pungent pain on the region of the liver, and diaphragm, a tenſion of the hypochondria, yellowneſs of the ſkin and eyes, and a ſaffron-coloured urine, are ſigns of an inflammatory diſpoſition of the liver. See the article JAUNDICE.

This diſeaſe terminates as other inflammations; being cured by reſolution, concoction, and excretion, of the morbid matter ; or it terminates in an abſceſs, ſcirrhus, or gangrene. See the articles ABSCESS, &c.

During the firſt ſtate, Arbuthnot tells us, that a warm regimen and ſaffron, which ſome reckon a ſpecific, are improper. On the other hand, that cooling, reſolving liquors, taken inwardly, as whey and ſorrel boiled in it, outward fomentations, and frequent injections of clyſters, bathing and frictions, relax and render the matter fluid. Honey with a little rheniſh wine and vinegar, the juices and jellies of ſome ripe garden-fruits, and thoſe of ſome lacteſcent plants, as endive, dandelion, and lettuce, are reſolvent. Violent purging hurts; gently relaxing the belly relieves, diluents with nitrous ſalts are beneficial, or tamarinds boiled in warm water, or whey. The feveriſh matter is often carried off by urine, and therefore diuretics not highly ſtimulating are proper.

If the inflammation be recent, extremely violent and without any ſigns or hopes of reſolution, concoction, and excretion, Boerhaave adviſes, that the caſe be treated with the ſame cautions and remedies as is directed in pleuriſies, and other ſimular inflammatory diſorders; ſuch remedies only excepted, as the ſituation of the part affected cannot admit of, except only, that all antiphlogiſtic fluids, either drank or injected by clyſters, are particularly ſerviceable in the caſe before us.

INFLAMMATION *of the lungs*. See the article PERIPNEUMONY.

INFLAMMATION *of the pleura*. See the article PLEURISY.

INFLAMMATION *of the ſtomach* is known by a burning, fixed, and pungent pain in the ſtomach, which is exaſperated at the inſtant any thing is taken into it, and is ſucceeded by a moſt painful vomiting and hiccough. There is, beſides, an inward heat, anxiety, and a tenſive pain about the precordia, an acute continual fever, great thirſt, difficult breathing, inquietude, toſſing of the body, coldneſs of the extreme parts, a hard, contracted, quick, and ſometimes, unequal pulſe. In the medical eſſays, we have an inſtance of this diſeaſe being attended with a hydrophobia. See HYDROPHOBIA. Boerhaave ſays, that this diſeaſe, if not ſuddenly cured, is generally mortal: therefore, that as ſoon as it is diſcovered, plentiful bleeding is neceſſary, that the patient's drink ſhould be very ſoft, antiphologiſtic, and emollient ; and alſo that clyſters of the ſame kind ſhould be adminiſtered to him.

Arbuthnot adviſes, that the patient ſhould totally abſtain from every thing that has acrimony in it; even the cooling nitrous ſalts, which are beneficial in other inflammations, irritate too much. Vomits, cordials, and ſpirituous liquors, are little better than poiſon: milk generally curdles. Aliments muſt be given frequently, and by a ſpoonful at a time, for any diſtenſion increaſes the inflammation. A thin gruel of barley, oatmeal, whey, with a very little ſugar, or honey, or chicken broths, are proper aliments: whey-emulſions, barley-water, and emollient decoctions are proper drinks. If poiſons of the cauſtic kind or metallic medicines ill prepared cauſe the inflammation, oily fat things are proper, as new milk, cream, oil of ſweet almonds, or oil of olives taken often and plentifully, according to Hoffman. If in the cholera morbus an inflammation is apprehended, he adviſes abſorbents and burnt hart's horn, with gelatinous decoctions of calves and neats feet, or hartſhorn-jellies, and water-gruel. Outwardly he recommends the following liniment as uſeful in all caſes; take oil of ſweet almonds, two ounces; camphire, one dram ; make a liniment, with which anoint frequently the precordia, applying a hot linen-cloth over it. The following epithem he recommends as an excellent diſcutient and ſudorific. Take of the vinegar of roſes, two ounces; ſpirit of wine camphorated, two drams; tincture of ſaffron, and tincture of caſtor, of each one dram ; nitre, half a dram

let this epithem be applied warm to the region of the ſtomach.

If there happens an impoſthume, honey, and even honey of roſes, taken inwardly, is according to Arbuthnot, a good cleanſer; and decoctions of comfrey-roots, healing.

INFLAMMATION of the tonſils. See the article TONSILS.

INFLAMMATION *of the womb or uterus*, appears from extraordinary heat and a fixed pain in the groin, with an acute fever, a pain in the loins and belly, an inflation of the abdomen, a ſtimulus to make water and to go to ſtool, heat, and a difficulty of urine.

Other ſymptoms, according to Aſtruc, are a tumour, pain, heat, and tenſion of the hypogaſtric region, redneſs of the os uteri, and great heat of the vagina. If the fore-part of the uterus is affected, there is a dyſury; if the back part, a teneſmus; frequent faintings and cardialgia, a burning fever; or, if the inflammation is violent, a lipyria, in which the external parts or extremities are cold, and the internal burn, and the pulſe is imperceptible; a delirium and phrenſy; the breaſts ſwell, in proportion as the inflamed uterus.

Hoffman diſtinguiſhes this diſeaſe into the ſuperficial and more profound. He ſays, that it is eaſily formed in child-bed women, and frequently accompanies the milk-fever, and may be cured in a few days if rightly managed. But that when it is more intenſe, and attended with grievous ſymptoms without remiſſion, it kills on the ſeventh, ninth, or eleventh day; a white miliary fever generally ſupervenes, which is the worſt omen, as it ſhews a mortification of the uterus. See the article MILIARY FEVER.

If the inflammation is not reſolved, it generally ends in a mortification, ulcer, cancer, or ſcirrhus.

Women in child-bed ſometimes have the womb inflamed, from the fault of an unſkilful midwife, or hard labour; or the lochia being ſtopped by pains or hyſterical ſpaſms, dread or cold: wherefore proper precautions ſhould be taken to prevent it, for which purpoſe Hoffman adviſes to keep them under a gentle diaphoretic regimen, and to allay the almoſt febrile heat; to which end oil of almonds alone is very proper, or with a fourth part of ſperma ceti given daily to half an ounce in chicken-broth: externally the whole abdomen ſhould be anointed with oil of dill, camomile and white lilies, of each an ounce; oil of caraways, a dram; or a dram of camphire; laying a warm napkin doubled over the ſame. The tumult being thus appeaſed, the lochia are to be promoted with pills made of bitter extracts, temperate reſinous gums and aloes well corrected, of which fifteen grains is a doſe, morning and evening, to be continued from five to eight days: theſe are alſo good when the after-birth, or part of it is retained.

If there is a fever, the belly is diſtended with wind, the lochia are retained, and the ſpaſms tend to the upper parts; then the laſt-mentioned author directs the patient to be bled in the foot, and to render the ſtagnating blood fluxile by the following mixture. Take chervil-water, the carduus benedict. ſcordium, elder-flowers, acacia, and diſtilled vinegar, each an ounce and half; crabs-eyes, a dram and a half; powder of antimony, half a dram; ſpirit of nitre dulcified, twenty drops; ſyrup of card. benedict. two drams; let the patient take two or three ſpoonfuls every two hours. The drink may be chicken-broth with ſcorzonera-root, ſuccory and ſhavings of hartſhorn boiled therein.

In women out of child-bed, the inflammation generally happens in the neck of the uterus and the vagina, and then beſides the foregoing things, the ſame author recommends the application of epithems to the pubes, uterine injections, peſſaries, and ſuppoſitories: the epithem may be of arquebuſade water, four ounces; eſſence of ſaffron, camphorated ſpirit of wine, of each two ounces; nitre, a dram, diſſolved in elder flower water; and as circumſtances require, mixt with vinegar of rue, or ſcordium, and applied with a double cloth. The injection may conſiſt of aſſes-milk with flowers of elder, myrrh, and ſaffron, and a little nitre may be added to the decoction. The teneſmus may be appeaſed with emollient half baths, or with one ounce of oil of ſweet almonds, and twelve grains of ſaffron, injected into the anus. Theſe remedies are uſeful in caſe of a ſuppuration.

If it proceeds from external cauſes, and there is a fever, pain in the groin, difficulty of urine, and coſtiveneſs, bleed firſt in the arm, and then in the foot; give a clyſter, and apply melilot-plaſter, two ounces; ſperma ceti, half an ounce; gum ammoniac, two drams; ſaffron, one

 dram;

dram; camphire, half a dram, mixt together; not omitting gentle diaphoretics and diſcutients.

INFLAMMATORY DISEASES. To theſe may be referred the ſeveral diſeaſes mentioned in the preceding article, either attended with a fever, as well as leſſer inflammations without a fever; beſides all chronic diſorders ariſing from inflammations, the chief whereof are old coughs, conſumptions and the rheumatiſm, without a fever. See COUGH, *&c.*

Hoffman lays down this as an axiom, for all practitioners to obſerve; that in all inflammatory diſeaſes of the nervous and membranaceous parts, as in the phrenzy, pleuriſy, in the inflammation of the liver, ſtomach, inteſtines, and bladder, nothing is more pernicious, or brings on death more ſuddenly, than opiates taken inwardly.

INFLAMMATORY FEVERS are diſtinguiſhed into two ſtages; the firſt, whilſt the pulſe continues hard, in which it is proper to bleed; the ſecond, when the inflammatory ſymptoms ſtill remaining, the pulſe is too low for that evacuation; in this ſtate bliſters are the chief remedy, and which, except in a few ſingular caſes, are not to be uſed ſooner. If the bliſters are large, it is better to apply them gradually, than many at a time. See the articles FEVER and INFLAMMATION.

INFLECTION, or *Point of* INFLECTION, in the higher geometry, is the point where a curve begins to bend a contrary way. See the article FLEXURE.

To determine the point of inflection in curves, whoſe ſemi-ordinates C M, C *m* (pl. CXLVI. fig. 2 n°1. and 2.) are drawn from the fixed point C; ſuppoſe C M to be infinitely near C *m*, and make *m* H = M *m*; let T *m* touch the curve in M. Now the angles C *m* T, C M *m*, are equal; and ſo the angle C *m* H, while the ſemi-ordinates increaſe, does decreaſe, if the curve is concave towards the center C, and increaſes if the convexity turns towards it. Whence this angle, or, which is the ſame, its meaſure will be a minimum or maximum, if the curve has a point of inflection or retrogreſſion; and ſo may be found, if the arch T H, or fluxion of it, be made equal to o, or infinity. And in order to find the arch T H, draw *m* L, ſo that the angle T *m* L be equal to *m* C L; then if C *m* = *y*, *m r* = *x*, *m* T = $\dot{t}$, we ſhall have $y : \dot{x} :: \dot{t} : \frac{\dot{t}\dot{x}}{y}$. Again, draw the arch H O to the radius C H; then the ſmall right lines *m r*, O H, are parallel; and ſo the triangles O L H, *m* L *r*, are ſimilar; but becauſe H I is alſo perpendicular to *m* L, the triangles L H I, *m* L *r*, are alſo ſimilar: whence $\dot{t} : \dot{x} :: y : \frac{\dot{x}\ddot{y}}{\dot{t}}$; that is, the quantities *m* T, *m* L, are equal. But H L is the fluxion of H *r*, which is the diſtance of C *m* = *y*; and H L is a negative quantity, becauſe while the ordinate C M increaſes, their difference *r* H decreaſes; whence $\dot{x}x + \dot{y}y - \dot{y}\dot{y} = o$, which is a general equation for finding the point of inflection, or retrogradation.

INFLECTION, in grammar, the variation of nouns and verbs, by declenſion and conjugation. See the articles DECLENSION and CONJUGATION.

INFLEX LEAF, among botaniſts, one whoſe point bends inward, towards the ſtem of the plant. See the article LEAF.

INFLUENCE, a quality ſuppoſed to flow from the heavenly bodies, either with their light or heat; to which aſtrologers idly aſcribe all ſublunary events.

INFLUENT FEVER, the ſame with a nervous one. See the article FEVER.

INFORCED, and INFORCEMENT. See REINFORCED and REINFORCEMENT.

IN FORMA PAUPERIS, in law. See the article FORMA.

INFORMATION, in law, is nearly the ſame in the crown-office, as what in our other courts is called a declaration. It is ſometimes brought by the king, or his attorney-general, or the clerk of the crown-office; and at other times by a private perſon, who informs or ſues, as well for the king as himſelf, upon the breach of ſome popular ſtatute, in which a penalty is given to the party that will ſue for it. It differs from an indictment, which muſt be found by the oaths of ten men at leaſt; for an information is only the allegation of the perſon that brings it. An information lies for offences at common-law, as batteries, conſpiracies, nuſances, contempts, libels, ſeditious words, *&c.* and in many caſes by ſtatute, on which the offender is rendered liable to a fine, or other penalty: an information alſo lies againſt the inhabitants of a town, for not repairing the highways, for going armed in affray of the peace, *&c.* and in general for any offence againſt the public good, or the principles of juſtice: but where an information brought is only for vexation, the defen-

defendant may bring an information againſt ſuch vexatious informer. All informations brought by informers on penal ſtatutes, where a certain ſum is allowed him, muſt be brought in the county where the offence was committed, and within a year after the fact was done; but a party aggrieved, not being a common informer, is not obliged to bring his information in the proper county; for he may lay in what county he pleaſes. If an informer, without leave of the court, compounds with the defendant, he forfeits 10 l. and may be ſet in the pillory. Where an information is exhibited for treſpaſs, battery, &c. to which the defendant appears and pleads to iſſue, and the proſecutor does not bring on the trial within a year after the iſſue joined; or if a verdict paſs for the defendant, the court is to allow the defendant coſts, unleſs it appears that there was reaſonable cauſe for the information. 4 & 5 Will & Mar. cap. xviii. After a plea is put in to an information for any offence, the defendant may be ſo far indulged by the court, as to appear by his attorney. A replication to an information on a ſpecial plea in the courts of Weſtminſter, muſt be made by the attorney-general; but if it be before the juſtices of aſſize, it muſt be made by the clerk of aſſize: yet the replication to a general iſſue on an information qui tam (that is, at the ſuit both of the king and the party) in the courts of Weſtminſter, may be made in the name of the attorney general only; and in ſuch actions, moſt of the precedents are for the replication to be made by the plaintiff, and a demurrer may be made to an information qui tam, without the attorney-general.

INFORMER, a perſon that informs againſt or proſecutes another, upon any penal ſtatute. See the preceding article.

INFORMATUS NON SUM, in law. See the article NON SUM INFORMATUS.

INFORMIS, ſomething irregular in its form, or figure. See the article FIGURE and FORM.

Hence, ſtellæ informes, in aſtronomy, are ſuch of the fixed ſtars as are not reduced into any conſtellation. See the articles CONSTELLATION and STAR.

INFRACTION, a term chiefly uſed to ſignify the violation of a treaty. See the article TREATY.

INFRALAPSARIANS, in church-hiſtory, an appellation given to ſuch predeſtinarians, as think the decrees of God, in regard to the ſalvation and damnation of mankind, were formed in conſequence of Adam's fall. See PREDESTINATION.

INFRASCAPULARIS, in anatomy, one of the depreſſor-muſcles of the arm, which has its origin from the whole internal ſurface of the ſcapula, and its termination in the interior part of the humerus. See the article DEPRESSOR.

INFRASPINATUS, in anatomy, one of the abductor muſcles of the arm, which has its origin in the cavity below the ſpine of the ſcapula. See ABDUCTOR.

INFULA, in antiquity, a broad kind of fillet, made of white wool which the prieſts uſed to tie round their heads. Hence Virgil, Æn x. 538.

Infula cui ſacra redimibat tempora vitta.

INFUNDIBULIFORM, in botany, an appellation given to ſuch monopetalous or one-leaved flowers, as reſemble a funnel in ſhape, or which have a narrow tube at one end, and gradually widen towards the limb or mouth. There are two kinds of infundibuliform, or funnel-faſhioned flowers; one of which is like an inverted hollow cone, and the other ſomewhat like a ſaucer, and thence called hypocrateriform. See the article FLOWER.

INFUSION, in pharmacy, a method of obtaining the virtues of plants, roots, &c. by ſteeping them in a hot or cold liquid.

Hot infuſions are made by pouring boiling water, or any other menſtruum, on the drugs whoſe virtues we would extract: thus, in order to obtain the common infuſion of ſena, take the leaves of ſena, an ounce and a half; of cryſtals of tartar, three drams; of the leſſer cardamom-ſeeds huſked, two drams: boil the cryſtals of tartar in a pint of water till they are diſſolved, then pour the water, while boiling hot, upon the ſena and the reſt; and when the liquor is cold, ſtrain it off.

But all tinctures and infuſions of ingredients, whoſe principal virtues depend upon their lighter or more ſubtile and ſpirituous parts ſhould not be made by ſteeping them in a hot, but in a cold menſtruum; and if ſuch infuſions be required rich and ſtrong, they are to be made ſo, not by ſuffering the menſtruum to be heated, or to remain long upon the ingredients, but by adding freſh ingredients ſeveral times to the ſame liquor, infuſing them quick, and each time keeping out the ingredients that have been once uſed: by this means we ſhall procure

cure the full virtues of ſimples, unaltered in their nature, yet exalted or concentrated to ſuch a degree, that a few ſpoonfuls of the liquor ſhall contain the ſpirit or quinteſſence of a pound of the plant. This is an effect not to be expected from fire, which almoſt conſtantly alters the nature of things committed to it; nor could a valuable eſſence of violets, jaſmin, lilies, borage-flowers, or any flower or plant of an extremely fine odoriferous ſpirit, be procured by heat, as it readily may by ſteeping theſe flowers in cold water, cold vinegar, cold wine, and the like; and frequently pouring the tincture upon freſh flowers, till the liquor becomes ſtrongly impregnated.

INGANNO, in muſic, is when having done every thing proper for ending a cadence, a mark of ſilence is placed inſtead of the final, which the ear naturally expects, and is deceived. See CADENCE.

INGELSHEIM, a town of Germany, in the palatinate of the Rhine, eight miles ſouth-weſt of Mentz: eaſt longitude 7° 40′, and north latitude 50°.

INGENUITAS REGNI, antiently ſignified the commonalty of the realm; and it is ſaid, that this title was likewiſe given to the barons and lords of the king's council.

INGENUOUS, *ingenuus*, in roman antiquity, an appellation given to perſons born of free parents, who had never been ſlaves: for the children of the liberti, or perſons who had obtained their liberty, were called libertini, not ingenui; this appellation of ingenuous being reſerved for their children, or the third generation.

INGINEER, or ENGINEER. See the articles ENGINEER and GUNNERY.

INGLUVIES, the crop or craw of granivorous birds, ſerving for the immediate reception of the food, where it is macerated for ſome time, before it is tranſmitted to the true ſtomach.

INGOLSTAT, a town of Germany, in the circle of Bavaria, ſituated on the river Danube, thirty miles weſt of Ratiſbon: eaſt long. 11° 30′, and north lat. 48° 45′.

INGOT, a maſs of gold or ſilver, melted down and caſt in a mould, but not coined or wrought. See the articles GOLD and SILVER.

INGRAFTING, or GRAFTING, in gardening. See the article GRAFTING.

INGRAILED, or ENGRAILED, in heraldry. See the article ENGRAILED.

INGRAVING, or ENGRAVING. See the article ENGRAVING.

INGREDIENTS, in pharmacy, whatever ſimple medicines enter the compoſition of a compound one.

INGRESS, in aſtronomy, ſignifies the ſun's entering the firſt ſcruple of one of the four cardinal ſigns, eſpecially aries.

INGRESS, EGRESS, and REGRESS, in law, words frequently uſed in leaſes of lands, which ſignify a free entry into, a going out of, and returning from ſome part of the premiſes leaſed to another.

INGRESSU, in law, a writ of entry, termed alſo a præcipe quod reddat. See the articles ENTRY and PRECIPE.

INGRIA, a province of Ruſſia, bounded by the lake Ladoga, the river Nieva, and the gulph of Finland on the north, by Novogorod on the eaſt and ſouth, and by Livonia on the weſt.

INGROSSER, one who buys up great quantities of any commodity, before it comes to market, in order to raiſe the price.

If a perſon gets into his hands, otherwiſe than upon a demiſe or grant of lands, any corn growing, butter, cheeſe, fiſh, or other victuals, within the kingdom, with intent to ſell the ſame again at a high price, he ſhall be deemed an unlawful ingroſſer. But the buying of corn to be ground into meal, or for making of ſtarch, in order to ſell it again; or barley and oats to make malt and oatmeal, are not included in this ſtatute. Foreign corn and victuals, except fiſh, are alſo exempted; as are licenced badgers, fiſhmongers, butchers, poulterers, &c. that buy in their own ways of dealing, and are not guilty of foreſtalling, or ſelling the ſame again at unreaſonable prices by retail. A merchant who imports victuals or merchandize into this kingdom, may diſpoſe of the ſame in groſs; yet the perſon who purchaſes them of him, may not do ſo, ſince by that means the price would be enhanced. If this was allowed, a monied man might ingroſs into his hands a whole commodity, with an intent to ſell it again at what price he thought proper: but the ingroſſing the whole of any commodity is indictable, and the offender, whether he ſell any part of them or not, is ſubject both to a penalty and to corporal puniſhment, by common law.

INGROSSER alſo ſignifies a clerk or perſon who

who copies records, deeds, or other instruments of law, on skins of parchment.

INGROSSING *of a fine*, is the chirographer's making the indentures of a fine, and also the delivery of it to him on whom it is levied. See the article CHIROGRAPHER.

INGUEN, in anatomy, the same with what is otherwise called groin, or pubes. See the article PUBES.

INGUINAL, in anatomy, &c. any thing belonging to the groin. Hence,

INGUINAL HERNIA is a hernia in that part called by surgeons bubonocele. See the article BUBONOCELE.

INHARMONICAL RELATION, in music, is much the same with discord. See the articles DISCORD and RELATION.

INHERENCE, in philosophy, a term sometimes used to denote the connection of an accident with its substratum, or substance. See the articles ACCIDENT and SUBSTANCE.

INHERITANCE, a perpetual right or interest in lands, invested in a person and his heirs.

The term inheritance is used, not only where a person has lands or tenements by descent; but where he becomes seized in fee-simple, or fee-tail, by purchase. The inheritances mentioned in our law are either corporeal or incorporeal: the corporeal relate to lands, tenements, &c. that may be touched or handled; and the incorporeal, to such rights as are annexed to corporeal inheritances, as advowsons, tithes, annuities, offices, &c. There is likewise another inheritance, which is termed several, that is, where two or more hold lands or tenements severally; as when two persons hold to them and the heirs of their two bodies; in which case these two have a joint estate during their lives, but their heirs have several inheritances.

According to the law of inheritances, the first child is always preferred, and the male before the female; and he that has the whole blood, before another that has only a part of the blood of his ancestor.

As to goods and chattels, they cannot be turned into an inheritance.

INHIBITION, a writ to forbid a judge's proceeding in a cause that lies before him. This writ generally issues out of an higher court-christian to an inferior, and is of much the same nature as a prohibition. See the article PROHIBITION.

INHUMATION, in chemistry, a method of digesting substances by burying the vessel, in which they are contained, in horse-dung or earth. See the article DIGESTION.

INJECTION, in surgery, the forcibly throwing certain liquid medicines into the body, by means of a syringe, tube, clyster-pipe, or the like.

Many disorders are very difficultly, if at all curable, unless some proper liquor be injected into the parts affected; which is performed by drawing the liquor into the syringe, and forcing it out again into the disordered parts. In doing this, one caution is extremely necessary, *viz.* to apply the instrument very carefully, and to be mindful that the liquor you inject be not too hot or cold.

As for injections in the gonorrhœa, disorders of the uterus, &c. See the articles GONORRHOEA, FLUOR ALBUS, SYRINGE, &c.

Surgeons also describe the manner of injecting liquors into the veins of living men, or other animals. A vein being opened, usually in the arm, as in bleeding, the small pipe of the syringe is introduced, and the liquor is injected or forced into the vein upwards, towards the heart; which being done, the orifice is to be dressed in the same manner as after bleeding.

Though this practice is at present disused, on account of the bad consequences attending it; yet the injection of proper medicines in apoplexies, quinzies, the hydrophobia, &c. wherein no medicine at all can be taken by the mouth, deserves to be tried.

Anatomical INJECTION, the filling the vessels with some coloured substance, in order to make their figures and ramifications visible.

For this purpose, a fine red injection is prepared thus: pour a pint of oil of turpentine on three ounces of vermilion, stir them well together, and then strain all through a fine linen-cloth. If a green injection is wanted, distilled verdigrease may be used instead of the vermilion.

A coarse injection may be made of one pound of tallow, five ounces of white-wax, three ounces of oil of olives, melted together, and adding two ounces of venice-turpentine; and when this is dissolved, three ounces of vermilion or verdigrease, are to be thoroughly mixed with the other ingredients, and the whole strained through a linen-cloth.

For the manner of preparing bodies to be injected, see the article PREPARATION.

INI-

INITIATED, in antiquity, a term chiefly ufed in fpeaking of perfons who were admitted to a participation of the facred myfteries among the heathens. See the article MYSTERY.

INJUNCTION, in law, is a writ or kind of prohibition granted in feveral cafes; and for the moft part grounded on an interlocutory order or decree, made in the court of chancery or exchequer, for ftaying proceedings either in courts of law, or ecclefiaftical courts. An injunction is obtained either for not appearing and putting in an anfwer in due time, upon equity confeffed, or upon matter that appears on record. If it be for ftaying fuits in other courts, it is grantable on fuggeftion of fome matter, by which the plaintiff is rendered incapable of making his defence there, either for want of witneffes, from his being fued at law for what in equity he ought not to pay, or becaufe the court, in which he is fued at law, acts erroneoufly, or denies him the benefit of the law, &c. Sometimes it iffues on the defendant's non-appearance, to give a complainant poffeffion of lands, &c. and fometimes for ftaying wafte, in which laft cafe an affidavit muft be firft made, of wafte committed in lands, &c. This writ is directed not only to the party himfelf, but to all and fingular his counfellors, attornies, and folicitors; and, therefore, if any attorney, after having been ferved with an injunction, proceeds againft the party that obtained it, the court, out of which it iffued, will commit him to the fleet prifon for contempt: but as an injunction ought not to be granted in a criminal cafe, fo whenever this happens, the court of king's bench may break it, and protect thofe that proceed in contempt of it.

INJURY, any wrong done to a man's perfon, reputation, or goods. See the articles ASSAULT, TRESPASS, &c.

INK, *atramentum*, a black liquor generally made of an infufion of galls, copperas and a little gum arabic. See the articles GALLS, COPPERAS, &c.

To make a very good ink for writing: take three ounces of good galls, reduced to powder, which infufe in three pints of river or rain-water, fetting it in the fun or a gentle heat, for two days; then take common copperas, or green vitriol, three ounces, powder it, put it into the infufion, and fet it in the fun for two days more; laftly, fhake it well, and add an ounce of good gum arabic.

To make the London powder-ink: take ten ounces of the cleareft nut-galls, which reduce to a fine powder; then add two ounces of white copperas, four ounces of roman vitriol, and of gum arabic or fandarach an ounce; pound and fift them very fine. This powder, though whitifh itfelf, will, when put into water, turn it to a good black ink: an ounce of the powder ferves to make a pint of ink.

To make a fhining ink: take gum arabic and roman vitriol, of each an ounce; galls well bruifed, a pound; put them into rape-vinegar, or vinegar made of clear fmall beer; fet them in a warm place, ftir them often till the liquor becomes black, and then add to a gallon of this preparation an ounce of ivory-black, and a quarter of a pint of feed-lac-varnifh.

To make a fhining japan or china ink: take an ounce of lamp black, and clarify it in an earthen pipkin, to take out the drofs; two drams of indigo; half a dram of peach-black; one dram of black endive, burnt; reduce them to a very fine powder, and then take a moiety of fig-leaf-water, another part of milk, and a very little gum arabic, and mixing all the ingredients well together, make them up for ufe.

Printing INK is made by boiling or burning linfeed oil till it is pretty thick, adding a little rofin to it, while hot, and then mixing this varnifh with lamp-black.

Printing-ink, on its being imported from abroad, pays 7 s. 8 $\frac{4}{100}$d. the hundred weight, of which 6 s. 9 d. is repaid on its exportation.

INK is alfo an appellation given to any coloured liquor, ufed in the fame manner as the atramentum, or black ink; as red, green, blue, yellow, &c. inks.

Red ink is made thus: take wine vinegar a pint; rafpings of brazil, one ounce; alum, half an ounce; boil them gently, and add five drams of gum arabic: diffolve the gum, ftrain the ingredients, and keep the liquid for ufe.

Green ink is made by boiling verdigreafe with argol, in fair water, and adding a little gum arabic.

Blue ink is made by grinding indigo with honey and the white of eggs, and making it fluid with water.

Yellow ink is made by an infufion of faffron in water, with a little alum and gum arabic.

Sympathetic INK, a liquor with which a perfon may write, without the letters appearing;

pearing, till ſome means be taken to render them legible.

Of this kind are the glutinous juices of plants, or any other thick and viſcid fluids, provided they have no remarkable colours themſelves; for being written on white paper, nothing will appear, till ſome fine powder of any coloured earth is thrown over the paper, whereby the letters become legible: the reaſon of this is evident, as the powder ſticks only to the letters formed by the inviſible but viſcid liquor.

Another ſort of ſympathetic inks are made of infuſions, the matter of which eaſily burn to a charcoal: thus, if a ſcruple of ſal armoniac be diſſolved in two ounces of fair water, letters written therewith will be inviſible till held before the fire; for the ſal armoniac being burnt to a charcoal, by a heat not ſtrong enough to ſcorch the paper, the letters are thereby rendered viſible.

Another ſort of ſympathetic inks are made of a ſolution of lead in vinegar, and a lixivium of lime and orpiment; for if a letter be written with the former, nothing will appear: but to conceal the affair ſtill more, ſome different ſubject may be written above it, with a black ink made of burnt cork and gum-water; then, if a piece of cotton, wetted with the ſaid lixivium, be rubbed over the paper, the ſentence that was viſible will diſappear, and the inviſible one, before written with the ſolution of lead, will be ſeen in its place very black and ſtrong.

INK FISH, *ſepia*. See the article SEPIA.

INLAGATION, the reſtoring an outlawed perſon. See OUTLAWRY.

INLAND *bills of exchange*, thoſe payable in diſtant parts of this kingdom.

If any ſuch bills be loſt, or miſcarry, within the time limited for payment, the drawer is obliged to give other bills of the ſame tenor; ſecurity being given, if demanded, in caſe the loſt bill be found again.

In caſe the party on whom an inland bill of exchange ſhall be drawn, ſhall refuſe to accept the ſame, the party to whom payable ſhall cauſe ſuch bill to be proteſted for none-acceptance, as in caſe of foreign bills; for which proteſt he ſhall pay two ſhillings, and no more. See BILL, ACCEPTANCE, PROTEST, &c.

INLAYING, the art of marquetry. See the article MARQUETRY.

INN, a place appointed for the entertainment and relief of travellers.

Inns are licenſed and regulated by juſtices of the peace, who oblige the landlord to enter into recognizances for keeping good order. If a perſon who keeps a common inn, refuſes to receive a traveller into his houſe as a gueſt, or to find him victuals and lodging, on his tendering a reaſonable price for them, he is liable to an action of damages, and may be indicted and fined at the king's ſuit. The rates of all commodities ſold by innkeepers, according to our antient laws, may be aſſeſſed: and inn-keepers not ſelling their hay, oats, beans, &c. and all manner of victuals, at reaſonable prices, without taking any thing for litter, may be fined and impriſoned, &c. by 21 Jac. I. cap. xxi. Where an innkeeper harbours thieves, perſons of an infamous character, or ſuffers any diſorders in his houſe, or ſets up a new inn where there is no need of one, to the hindrance of antient and well governed inns, he is indictable and fineable; and by ſtatute, ſuch inn may be ſuppreſſed. Action upon the caſe lies againſt any inn-keeper, if a theft be committed on his gueſt, by a ſervant of the inn, or any other perſon not belonging to the gueſt; though it is otherwiſe where the gueſt is not a traveller, but one of the ſame town or village, for there the inn-keeper is not chargeable: nor is the maſter of a private tavern anſwerable for a robbery committed on his gueſt: it is ſaid, that even though the travelling gueſt does not deliver his goods, &c. into the inn-keeper's poſſeſſion, yet if they are ſtolen, he is chargeable. An inn-keeper is not anſwerable for any thing out of his inn, but only for ſuch as are within it; yet where he, of his own accord, puts the gueſt's horſe to graſs, and the horſe is ſtolen, he is anſwerable, he not having the gueſt's orders for putting ſuch horſe to graſs. The inn-keeper may juſtify the ſtopping of the horſe, or other thing of his gueſt, for his reckoning, and may detain the ſame till it be paid. Where a perſon brings his horſe to an inn, and leaves him in the ſtable, the inn keeper may detain him till ſuch time as the owner pays for his keeping; and if the horſe eats out as much as he is worth, after a reaſonable appraiſement made, he may ſell the horſe, and pay himſelf: but when a gueſt brings ſeveral horſes to an inn, and afterwards takes them all away except one, this horſe ſo left may not be ſold for payment of the debt for the others; for every horſe is to be ſold, only to make ſatiſ-

satisfaction for what is due for his own meat.

INNS *of court*, are colleges in London, for the study of the laws of England, with all conveniencies for the lodging and entertainment of the professors and students.

In these colleges, there are not only such students as study the laws of this kingdom, in order to render themselves capable of practising in the courts of law at Westminster; but also such other gentlemen of fortune as apply themselves to this study, in order to know and vindicate their rights, and to render themselves more serviceable to their country. Our inns of court, which are numerous, and justly famed for the production of men of learning, are governed by masters, principals, benchers, stewards, and other officers, and have public halls for exercises, readings, &c. which the students are obliged to attend and perform for a certain number of years, before they can be admitted to plead at the bar. These societies have not, however, any judicial authority over their members; but instead of this they have certain orders among themselves, which have, by consent, the force of laws: for lighter offences, persons are only excommoned, or put out of commons; for greater, they lose their chambers, and are expelled the college; and when once expelled out of one society, they are never received by any of the others. The gentlemen in these societies may be divided into benchers, outer-barristers, inner-barristers, and students.

The four principal inns of court are the Inner-temple, Middle-temple, Lincoln's inn, and Gray's Inn; the other inns are the two serjeant's inns; and the others, which are less considerable, are Clifford's inn, Symond's inn, Clement's inn, Lion's inn, Furnival's inn, Staple's inn, Thavies inn, Barnard's inn, and New-inn. These are mostly taken up by attorneys, sollicitors, &c. but they belong to the inns of court, who send yearly some of their barristers, to read to them.

INN-AND-INN, a game on dice, very much practised at an ordinary, may be played by two or three, each having a box in his hand. There are four dice, and you may drop what you please, sixpences, shillings, &c. or guineas. Every inn, you drop; and every inn-and-inn, you sweep all: likewise, if you throw out, if but two play, your adversary wins all; but if three play, the stake may be divided between the other two, or played for.

Here you are to observe, that out, is when you have thrown no doublets on the four dice; inn, is when you have thrown two doublets of any sort; and inn-and-inn, is when you throw all doublets, whether of any sort, or otherwise; as four aces, &c. or two aces, &c. and two of any other denomination. The battle may be for as much or as little as you please, and is not ended till every penny of that money be won: this seems just, since in a battle of ten pounds, a gentleman hath been reduced to five shillings, and yet hath won the battle at last.

Like all other games, this too has its tricks; we shall only mention one instance by way of example: a gentleman who had spent the greater part of his patrimony, bethought himself how he should retrieve it; and having been a considerable loser by gaming, he fixed on this as the basis of his future settlement; accordingly he at length contrived a box, not screwed within as usual, which, nevertheless, was so well painted as to look exactly like a screwed box; it was likewise but half board wide at top, and, narrow at bottom, so that he had the dice wholly under his own management. In short, with this box, and the artful placing of the dice, he won a thousand pounds the first night, at the game of inn-and-inn; next night he won an estate of two hundred a year; on which he forswore all gaming for the future, well knowing how many have been ruined by it.

INN, in geography, a large river which rises in a mountain of the Alps, in the country of the Grisons, runs north-east through Tyrol and Bavaria, and discharges itself into the Danube.

INN, or INNER, in the manege, is applied differently according as the horse works to the right or left, upon the volt; or as he works along by a wall, a hedge, or the like: for in moving by a wall, the leg next the wall is called the outer leg, and the other the inner leg: and upon volts, if a horse works to the right, the right heel is the inner heel, and the right leg the inner leg; but if he works to the left, the left heel is the inner heel, &c. At present, riding-masters, in order to be more easily understood, generally

generally uſe the terms right and left, inſtead of outer and inner.

INNATE IDEAS, thoſe ſuppoſed to be ſtamped on the mind, from the firſt moment of its exiſtence, and which it conſtantly brings into the world with it: a doctrine, which Mr. Locke has abundantly refuted. See the article IDEA.

INNERKEITHING, a port town of Scotland, in the county of Fife, ſituated on the north ſhore of the frith of Forth, ten miles north-weſt of Edinburgh.

INNERLOCHY, or FORT WILLIAM, a fortreſs erected in the highlands of Scotland, at the mouth of a bay or lake in the county of Lochabar, twenty-eight miles ſouth-weſt of Lochneſs: weſt long. 5° 15′, and north lat. 56° 55′.

INNISKILLING, a ſtrong town of Ireland, in the province of Ulſter, and county of Fermanagh: weſt long. 7° 50′, and north lat. 54° 20′.

INNOCENTS-DAY, a feſtival of the chriſtian church, obſerved on December 28, in memory of the maſſacre of the innocent children by the command of Herod, king of Judea; who being alarmed at hearing that an infant was born king of the Jews, and imagining that his own kingdom was in danger, ſent orders to have all the children ſlain that were in Bethlehem, and the adjacent country.

The greek church in their calendar, and the abyſſinians of Ethiopia in their offices, commemorate fourteen thouſand infants on this occaſion.

INNOMINATA OSSA, in anatomy, three bones, which compoſe the extreme part of the trunk of a human body. Theſe, though ſingle in adults, are in infants three perfectly diſtinct bones, each of which has its peculiar name; the upper one is called the ileum; the anterior one, the os pubis, or os pectinis; and the poſterior one, the os iſchium. Theſe are joined by the intervention of a cartilage, as it were in the middle of that ſingular cavity called the acetabulum, and continue viſibly diſtinct to the age of puberty; after which they coaleſce, and form one entire bone ſo perfectly, that there is not the leaſt veſtige remaining that they ever were ſeparate.

The innominata oſſa are joined on each ſide, in the hinder part, to the os ſacrum, by ligaments and cartilages, and form a very firm and ſtrong, though ſomewhat moveable articulation with it; and with this bone they alſo form the cavity called the pelvis; they alſo cohere with the os ſacrum on each ſide, by means of two peculiar and very robuſt ligaments, each being a finger's breadth broad, and two or three finger's breadth long.

The uſe of theſe bones are to ſupport and ſuſtain the ſpina dorſi, and indeed all the parts above themſelves; to make a firm and proper juncture of the other parts of the body with the thighs; to ſerve for the place of origin to ſeveral muſcles; to form the cavity of the pelvis, and to defend its contents from external injuries.

INNOVATION, or NOVATION. See the article NOVATION.

INNUENDO, a word that was frequently uſed in declarations of ſlander, and law-pleadings, when theſe were in latin, in order to aſcertain a perſon or thing before mentioned; but now, inſtead of the word innuendo, we ſay, meaning ſo and ſo.

The practice of ſtretching innuendos, it is obſerved, has of late years, in ſome particular caſes, too much prevailed amongſt us: however, it has been held, that an innuendo cannot make that certain which was uncertain before; nor will the law allow words to be enlarged by an innuendo, ſo as to ſupport an action on the caſe for uttering them. In ſlander, the perſon and words ſhould both of them be diſtinctly ſpecified, and not want an innuendo to make them out; and therefore an innuendo will not render an action for a libel good, where the preceding matter imports no ſcandal.

INOCULATION, in medicine, the art of tranſplanting a diſtemper from one ſubject to another, by inciſion, particularly uſed for engrafting the ſmall pox. See the article POX.

The deſign of this operation is to communicate by art a milder ſpecies of the ſmall pox to the infant or adult patient, than that received by the natural infection; and this by engrafting ſome of the variolous matter, in order to which a ſmall inciſion is to be firſt made, with a ſcalpel or lancet, through the ſkin of the arm, and having inſerted a ſmall particle of the purulent matter, taken from a mild kind of the pock, the little wound is then to be dreſſed with ſome dry lint, and covered with a plaſter. After the operation, the patient muſt conſtantly keep his chamber, the air of which ſhould be moderately warm, and his diet regulated by ſome prudent phyſician, by which means this diſorder will ſhew itſelf in ſeven or eight days, without any malignant ſymptoms, and if aſſiſted by a pro-

per regimen, and a moderate wramth, it ufually runs gently through its feveral ftages. When the patient has once had the diforder this way, though ever fo mild, it is certain from experience, that they never have it again; and therefore the opinion of thofe feems to be well grounded, who think that the propagation of the fmall pox by inoculation might be of general ufe and benefit to mankind, in preferving the lives of fome, and the moft important members of others, as the face, eyes, hearing, vifcera, *&c.*

Hiftory informs us, that the diforder was this way propagated many hundred years ago, among the Greeks, Turks, and Chinefe, whereas it is but of late years that the european nations have come into it, among which the englifh feem to have approved and followed it moft. The experiment fucceeded fo well in the hands of the britifh phyficians, that king George I. countenanced the fame in all his dominions, and from thence the practice prevailed with fuccefs in Germany, particularly in the dominions of Hanover.

It muft, however, be confeffed, that there were many, both among the French and Englifh, who endeavoured to fupprefs and vilify the practice in their writings; and indeed this practice has been lately forbid in France, and meets with lefs countenance in England than it formerly did; yet Heifter has thought, that all the objections that have been made to this practice are fufficiently anfwered and obviated by Dr. Jurin and other able phyficians.

Heifter declares himfelf of opinion, that fo far from thinking the practice fatal or mifchievous, he rather firmly believes it might, under a proper management, be of the greateft ufe and benefit to the lives and healths of mankind; for, as he judges, the fmall pox arife from a peftilential virus or matter lodged in the blood, from the very firft day of the birth, which breaks out almoft in every perfon, fooner or later, and the more early ufually the better, as it is feldom we obferve the pox favourable in thofe more advanced in years; fo that the matter feems to multiply itfelf in the blood, and augment with the patient's age. If, therefore, the diforder be procured of a mild kind by this operation, and the blood cleared of its latent virus, while fmall in quantity, and the infant young, he doubts not but many might by this means be not only preferved from death, but even conducted fafely through the feveral ftages of the difeafe, without the infults of its moft malignant fymptoms. We are convinced from experience, as well as reafon, that, the diforder which breaks out from a natural infection, is generally more fevere and fatal than that produced by art; and no wonder it fhould be fo, fince in the laft, the phyfician has the opportunity of choofing the moft favourable feafon, and of preparing his patient before-hand, by a proper regimen, diet, and medicines.

In the Phil. Tranf. vol. xlvii. we have a new method of inoculation, difcovered by Mr. Brooke, and communicated by him, in a letter, read before the Royal Society, May 14, 1752, to Dr. Parfons, fecretary to the fociety for foreign correfpondence, fhewing by experiments, that the pock may be engrafted without making any incifion, only by the application of a little lint impregnated with variolous matter, and confining it with an adhefive plafter. Mr. Brooke tried the experiment upon feveral patients, and always with fuccefs; the abforbent veffels, he believes, in young fubjects efpecially, will always take in a fufficient quantity of the matter to contaminate the whole mafs of the circulating fluids; and tho' the denfity of the pores, or fcaly infpiffations of the materia perfpirabilis, in adults, may in fome meafure prevent the diforder from being communicated by contact, yet friction will eafily remove that obftacle; for by this means the cuticle is made as thin as is required, and the warmth induced by friction will dilute the mouths of the abforbent veffels, and draw a moderate flux of juices to that part, fo that they may take in a fufficient quantity of variolous matter, to bring on the diforder.

In the fame volume of the Tranfactions, we have an extract of a letter to Dr. Maty, from Geneva, read June 18, following, concerning the introduction and fuccefs of inoculation in that city. Their firft method of doing it was generally the fame as is now practifed in England, whence inftructions were fent to Geneva, when they began to inoculate: yet three perfons were inoculated in a new manner; thefe were bliftered flightly by means of a fmall veficatory applied to that part of the arm where the incifion is ufually made. The blifter occafioned by this plafter was opened, and a pledgit, dipped in the

the pocky matter was applied to the excoriated part: fome pocky matter was made ufe of, which was kept three weeks; and fome that had even been kept four months, without any apparent difference in the effects from that which was frefh. The experience which they have hitherto had in Geneva, has fuggefted to them a conjecture, that the incifion ought to have been made deeper, where the matter, which is ufed, has been kept fome time. All who had been inoculated by that time at Geneva, had recovered; and the far greater part of them had but an inconfiderable number of puftules.

INOCULATION, or BUDDING, in gardening, is commonly practifed upon all forts of ftone-fruit, as nectarines, peaches, apricots, plumbs, cherries, as alfo upon oranges and jafmines; and, indeed, this is preferable to any fort of grafting for moft forts of fruit. The method of performing it is as follows: you muft be provided with a fharp penknife with a flat haft, which is to raife the bark of the ftock to admit the bud; and fome found bafs-mat, which fhould be foaked in water, to increafe its ftrength, and render it more pliable; then having taken off the cuttings from the trees you would propagate, you muft choofe a fmooth part of the ftock about five or fix inches above the furface of the ground, if defigned for dwarfs; but if for ftandards, they fhould be budded fix feet above ground. Then with your knife make an horizontal cut acrofs the rind of the ftock; and from the middle of that cut make a flit downwards, about two inches in length, fo that it may be in the form of a T; but you muft be careful not to cut too deep, left you wound the ftock; then having cut off the leaf from the bud, leaving the foot-ftalk remaining, you fhould make a crofs cut, about half an inch below the eye, and with your knife flit off the bud, with part of the wood to it: this done, you muft with your knife pull off that part of the wood which was taken with the bud, obferving whether the eye of the bud be left to it or not; for all thofe buds which lofe their eyes in ftripping, are good for nothing: then having gently raifed the bark of the ftock with the flat haft of your penknife clear to the wood, thruft the bud therein, obferving to place it fmooth between the rind and wood of the ftock, cutting off any part of the rind belonging to the bud, that may be too long for the flit made in the ftock; and fo having exactly fitted the bud to the ftock, tie them clofely round with bafs-mat, beginning at the under part of the flit, and fo proceeding to the top, taking care not to bind round the eye of the bud, which fhould be left open.

When your buds have been inoculated three weeks or a month, thofe which are frefh and plump, you may be fure are joined; and at this time you fhould loofen the bandage, which if it be not done in time, will injure if not deftroy the bud. The March following cut off the ftock floping, about three inches above the bud, and to what is left faften the fhoot which proceeds from the bud: but this muft continue no longer than one year; after which the ftock muft be cut off clofe above the bud. The time for inoculating is from the middle of June to the middle of Auguft: but the moft general rule is, when you obferve the buds formed at the extremity of the fame year's fhoot, which is a fign of their having finifhed their fpring growth. The firft fort commonly inoculated is the apricot, and the laft the orange-tree, which fhould never be done till the latter end of Auguft. And in doing this work, you fhould always make choice of cloudy weather; for if it be done in the middle of the day, when the weather is hot, the fhoots will perfpire fo faft, as to leave the buds deftitute of moifture.

INORDINATE PROPORTION, is where there are three magnitudes in one rank, and three others proportional to them in another, and you compare them in a different order. Thus fuppofe the numbers in one rank to be 2, 3, 9; and thofe of the other rank 8, 24, 36; which are compared in a different order, *viz.* 2 : 3 : : 24 : 36; and 3 : 9 : : 8 : 24. Then rejecting the mean terms of each rank, you conclude 2 : 9 : : 8 : 36.

INOSCULATION, in anatomy, the fame with anaftomafis. See ANASTOMASIS.

INQUEST, in law, fignifies an inquiry made by a jury, in a civil or criminal caufe, by examining witneffes. See the article JURY.

There is alfo an inqueft of office, ufed for the fatisfaction of the judges, and fometimes to make inquiry whether a criminal be a lunatic or not; upon which inqueft, if it be found that the criminal only feigns himfelf to be a lunatic, and at the fame time refufes to plead, he may be

be dealt with as one ſtanding mute. See the article MUTE.

Where a perſon is attainted of felony and eſcapes, and afterwards on being re-taken denies that he is the ſame man, inqueſt muſt be made into the identity of the perſon by a jury, before he can be executed.

INQUIRENDO, in law, an authority given to one or more perſons, to inquire into ſomething for the advantage of the king.

INQUISITION, in law, a manner of proceeding by way of ſearch or examination uſed on the king's behalf, in caſes of out-lawry, treaſon, felony, ſelf-murder, *&c.* to diſcover lands, goods, and the like, forfeited to the crown. Inquiſition is alſo had upon extents of lands, tenements, *&c.* writs of elegit, and where judgment being had by default, damages and coſt are recovered.

INQUISITION, in the church of Rome, a tribunal in ſeveral roman-catholic countries, erected by the popes for the examination and puniſhment of heretics.

This court was founded in the twelfth century by father Dominic and his followers, who were ſent by pope Innocent III. with orders to excite the catholic princes and people to extirpate heretics, to ſearch into their number and quality, and to tranſmit a faithful account thereof to Rome. Hence they were called inquiſitors; and this gave birth to the formidable tribunal of the inquiſition, which was received in all Italy, and the dominions of Spain except the kingdom of Naples and the Low Countries.

This diabolical tribunal takes cognizance of hereſy, judaiſm, mahometaniſm, ſodomy, and polygamy; and the people ſtand in ſo much fear of it, that parents deliver up their children, huſbands their wives, and maſters their ſervants, to its officers, without daring in the leaſt to murmur. The priſoners are kept for a long time, till they themſelves turn their own accuſers, and declare the cauſe of their impriſonment; for they are neither told their crime, nor confronted with witneſſes. As ſoon as they are impriſoned their friends go into mourning, and ſpeak of them as dead, not daring to ſolicit their pardon, leſt they ſhould be brought in as accomplices. When there is no ſhadow of proof againſt the pretended criminal, he is diſcharged, after ſuffering the moſt cruel tortures, a tedious and dreadful impriſonment, and the loſs of the greateſt part of his effects. The ſentence againſt the priſoners is pronounced publicly, and with extraordinary ſolemnity. In Portugal they erect a theatre capable of holding three thouſand perſons, in which they place a rich altar, and raiſe ſeats on each ſide in the form of an amphitheatre. There the priſoners are placed, and over-againſt them is a high chair, whither they are called, one by one, to hear their doom, from one of the inquiſitors.

Theſe unhappy people know what they are to ſuffer, by the cloaths they wear that day. Thoſe who appear in their own cloaths, are diſcharged upon payment of a fine: thoſe who have a ſanto benito, or ſtrait yellow coat without ſleeves, charged with St. Andrew's croſs, have their lives, but forfeit all their effects: thoſe who have the reſemblance of flames, made of red ſerge, ſewed upon their ſanto benito, without any croſs, are pardoned, but threatened to be burnt if ever they relapſe: but thoſe who, beſides theſe flames, have on their ſanto benito, their own picture, ſurrounded with figures of devils, are condemned to expire in the flames. The inquiſitors, who are eccleſiaſtics, do not pronounce the ſentence of death; but form and read an act, in which they ſay, that the criminal being convicted of ſuch a crime, by his own confeſſion, is with much reluctance delivered to the ſecular power to be puniſhed according to his demerits: and this writing they give to the ſeven judges, who attend at the right ſide of the altar, who immediately paſs ſentence. For the concluſion of this horrid ſcene, ſee the article ACT *of faith.*

INQUISITORS, in law, perſons who have power by their office to make inquiry in certain caſes; as ſheriffs, and coroners on view of the body, *&c.*

INROLLMENT, in law, is regiſtering any lawful act, as a ſtatute or recognizance acknowledged, a deed of bargain and ſale, *&c.* in the rolls of chancery, king's bench, common pleas, or exchequer, at the huſtings of Guildhall, London, or at the quarter-ſeſſions.

Inrollments of deeds muſt be recorded in court, and for the ſake of perpetuity ingroſſed on parchment: yet it is ſaid that inrolling a deed does not make it a record, which is an entry on parchment of judicial matters controverted in a court of record; and of which the court is to take

take notice: but the inrollment of a deed, is only a private act of the parties concerned, of which the court takes no notice at the time when it was done, tho' the court gives way and accedes to it. All deeds may be inrolled at common law, and tho' by accident a seal is broke off, it will not hinder it. A deed when inrolled must be acknowledged before a master in chancery, or a judge of the court where it is inrolled; which being the officer's warrant for its inrollment, such inrollment will be allowed as good proof of the existence of the deed itself.

Clerk of INROLLMENTS, or ENROLLMENTS. See the article CLERK *of enrollments*.

INSCONCED, in the military art, part of an army that have fortified themselves with a sconce or small fort, in order to defend some pass, *&c.*

INSCRIBED, in geometry. A figure is said to be inscribed in another, when all its angles touch the sides or planes of the other figure. See the articles HEXAGON, PENTAGON, *&c.*

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more distinct knowledge of it, or to transmit some important truth to posterity.

The inscriptions mentioned by Herodotus and Diodorus Siculus, sufficiently shew that this was the first method of conveying instruction to mankind, and transmitting the knowledge of history and sciences to posterity: thus the antients engraved upon pillars both the principles of sciences, and the history of the world. Pisistratus carved precepts of husbandry on pillars of stone; and the treaties of confederacy between the Romans and Jews, were engraved on plates of brass. Hence, antiquarians have been very curious in examining the inscriptions on ancient ruins, coins, medals, *&c.*

INSECTS, in zoology, a numerous class of animals, whose bodies are neither regularly covered with hair, feathers, or scales, as in the generality of other animals; but either with a hard, and as it were horny substance, or with a soft and tender skin; and of which the far greater part, that is, all the insects with a hard covering to their bodies, have on their heads antennæ, otherwise called horns and feelers.

The most general sub-division of insects is into two series, *viz.* the winged and naked ones; each of which comprehends several subordinate orders of genera, each containing numerous species.

The several orders of the first series are the coleoptera, hemiptera, neuroptera, lepidoptera, hymenoptera, and diptera; and those of the second series, are the aptera, reptilia, zoophyta, testacea, and lithophyta: of all which we have treated under their respective articles. See the articles COLEOPTERA, NEUROPTERA, *&c.*

Generation of INSECTS. See the article GENERATION.

INSERTION, in anatomy, the close conjunction of the vessels, tendons, fibres, and membranes of the body with some other parts. See the articles TENDONS, MUSCLE, *&c.*

INSIDIANT DISEASES, those which shew no evident symptom, but lie concealed in the body, ready to break forth on the least provocation, as it were by surprize.

INSINUATION, in our law, a clandestine creeping into a person's mind, or favour; but, among the civilians, it bears a different signification; as the insinuation of a will is the first production of it, *viz.* the leaving it in the hands of the register, in order to the procuring a probate thereof.

INSIPID, an appellation given to things without taste. See the article TASTE.

INSITION, in gardening, the same with grafting. See the article GRAFTING.

INSOLATION, in chemistry, the suffering matters to stand and digest in the heat of the sun, instead of that of a furnace. See FIRE and HEAT.

INSOLVENT, a term applied to persons unable to pay their debts. See the articles DEBT and DEBTOR.

INSPIRATION, among divines, implies the conveying of certain extraordinary and supernatural notices or motions into the soul.

In discoursing upon the argument concerning the inspiration of the scripture, the learned Du Pin alledges the testimony of the Jews, the authority of our Saviour and his apostles, and the universal consent of the christian church.

1. It cannot be in the least doubted, but that the antient Jews were thoroughly persuaded that the books in their canon were written by prophets divinely inspired: they looked upon the law of Moses as the law of God himself, and on the pentateuch as the foundation of their religion: they had even the evidence of

of their ſenſes, that Moſes was ſent by God, that he converſed familiarly with him, and was aſſiſted by him in an extraordinary manner; witneſs the many miracles which God wrought by him, and his divine providence and protection being vouchſafed to him in an unuſual manner; ſo that, upon the whole, they had all imaginable evidence that the laws and hiſtorical narrations of Moſes were all of them penned by inſpiration from heaven. As to the other canonical books collected by Ezra, it cannot be queſtioned with any colour of reaſon, but that Ezra, in drawing up his canon and ſacred books, made choice of thoſe which had the character of divinely inſpired writings, and had been always acknowledged as ſuch by the univerſal conſent of the jewiſh nation; and the ſynagogue looked upon this canonical ſyſtem as prophetical and divinely inſpired. See CANON and BIBLE.

2. From the unexceptionable teſtimony of the Jews, M. Du Pin proceeds to alledge the authority of our Saviour and his apoſtles. It is upon the evidence of theſe books that our Saviour proves himſelf to be the meſſias, and by them that he confutes the Jews. The apoſtles followed their maſter's doctrine in this as well as in all other things: theſe books they made uſe of to authoriſe the goſpel they preached, and to prove that the prophecies concerning the meſſias, were fulfilled in the perſon of Jeſus Chriſt.

3. From theſe authorities he proceeds to the teſtimony of the primitive church: thoſe who were inſtructed by our Saviour and his apoſtles, had not only the ſame regard for the books of the Old Teſtament as the Jews themſelves had, but likewiſe by univerſal conſent received the goſpels and epiſtles of the apoſtles as writings penned by the inſpiration of the holy ghoſt. The primitive chriſtians being fully perſuaded of this truth, received the apoſtles doctrine with intire ſubmiſſion, and looked upon it as no other than the inſtruction of Jeſus Chriſt and of God himſelf. See the article CHRISTIAN RELIGION.

INSPISSATING, in pharmacy, an operation whereby a liquor is brought to a thicker conſiſtence, by evaporating the thicker parts. See INCRASSATING.

INSPRUCK, a city of Germany, in the circle of Auſtria, capital of the county of Tyrol, ſituated on the river Inn, in eaſt long. 11° 26′, north lat. 47° 12′.

INSTALLMENT, the inſtating or eſtabliſhing a perſon in ſome dignity.

This word is chiefly uſed for the induction of a dean, prebendary, or other eccleſiaſtical dignitary, into the poſſeſſion of his ſtall, or other proper ſeat in the cathedral to which he belongs. It is alſo uſed for the ceremony whereby the knights of the garter are placed in their rank, in the chapel of St. George at Windſor, and on many other like occaſions. It is ſometimes termed inſtallation. See GARTER.

INSTANT, ſuch a part of duration wherein we perceive no ſucceſſion; or it is that which takes up the time only of one idea in our minds.

The ſchoolmen diſtinguiſh three kinds of inſtants; a temporary, a natural, and a rational inſtant.

Temporary inſtant is a part of time immediately preceding another: thus the laſt inſtant of a day precedes, immediately and really, the firſt inſtant of the following day.

Natural inſtant is what we otherwiſe call a priority of nature, which obtains in things that are ſubordinated in acting, as firſt and ſecond cauſes, or cauſes and their effects: for the nature of things requires, that if there be a ſecond cauſe there muſt be a firſt; and that there muſt be a cauſe, if there be an effect. See the article CAUSE.

Rational inſtant is not any real inſtant, but a point which the underſtanding conceives to have been before ſome other inſtant, founded on the nature of the thing which occaſioned it to be conceived: for inſtance, if God made ſeveral things voluntarily, which he could otherwiſe have let alone, there is a reaſonable foundation to conceive God ſuch as he is in himſelf, before he had made any of theſe voluntary determinations: but as there was no real inſtant when God had not formed any determination, this inſtant is called a rational inſtant, by way of oppoſition to an inſtant of time.

INSTAURATION, the re-eſtabliſhment or reſtauration of a religion, a church, or the like, to its former ſtate.

INSTEP, in the manege, is that part of a horſe's hind leg which reaches from the ham to the paſtern-joint; and which, when the horſe is in his natural poſture of ſtanding, ſhould be large, flat, and in a perpendicular line with the ground: for when the inſteps do not ſtand perpendicularly, it is a certain ſign of weakneſs

nefs either in the reins or hinder quarters.

INSTINCT, an appellation given to the fagacity and natural inclinations of brutes, which fupplies the place of reafon in mankind. See REASON and BRUTE.

INSTITUTES, in literary hiftory, a book containing the elements of the roman law, and conftitutes the laft part of the civil-law. See CIVIL-LAW.

The inftitutes are divided into four books, and contain an abridgment of the whole body of the civil-law; being defigned for the ufe of ftudents.

INSTITUTION, in general, fignifies the eftablifhing or founding fomething.

In the canon and common law, it fignifies the invefting a clerk with the fpiritualities of a rectory, &c. which is done by the bifhop, who ufes the formula, "I inftitute you rector of fuch a church, "with cure of fouls, and receive your "care and mine." This makes him a complete parfon as to fpirituality, but not as to temporality, which depends on induction. See the article INDUCTION.

The term inftitutions is alfo ufed, in a literary fenfe, for a book containing the elements of any art or fcience: fuch are inftitutions of medicine, inftitutions of rhetoric, &c.

INSTRUCTIVE COLUMN, in architecture. See the article COLUMN.

INSTRUMENT, in general, whatever is fubfervient to a caufe in producing any effect. See CAUSE and EFFECT.

A common cafe of mathematical inftruments contains feveral compaffes, a fector, fcale, drawing-pen, and protractor. See the articles COMPASSES, SECTOR, SCALE, &c.

A cafe of pocket inftruments for furgeons, which they ought always to carry about with them, contains lancets of different fizes; fciffars, fit for feveral ufes; forceps, plain and furnifhed with teeth; incifion-knives, ftraight and crooked; a fpatula, probes, needles, &c. See LANCET, SCISSARS, FORCEPS, &c.

The following inftruments ufed by furgeons, pay on their importation according to thefe rates. Trepans, the dozen pay 1 s. $11\frac{10}{100}$d. and draw back on exportation, 1 s. $8\frac{25}{100}$d. Bullet-fkrews, the dozen, pay $9\frac{24}{100}$d. and draw back $8\frac{10}{100}$d. Incifion-fheers, paices, or tooth drawers and plulicanes, the dozen pay $11\frac{55}{100}$d. and draw back $10\frac{12\frac{1}{2}}{100}$d. Setts, the bundle, containing fixteen, pay $4\frac{62}{100}$d. and draw back $4\frac{5}{100}$d. More if made of iron, for every 112 pounds, 4 s. $8\frac{25}{100}$d. and draw back 4 s. $8\frac{25}{100}$d. if made of fteel, the 112 pounds pay 5 s. $1\frac{87\frac{1}{2}}{100}$d. the whole of which is returned on exportation: but if they are made of filver, they are to pay as plate. See PLATE.

INSTRUMENT, in law, fome public act, or authentic deed, by which any truth is made apparent, or any right or title eftablifhed in a court of juftice. See DEED.

INSTRUMENTS, in mufic, are either played on by means of wind, as the organ, flute, hautboy, &c. or of ftrings, as the harpfichord, violin, &c. See the articles ORGAN, FLUTE, HARPSICHORD, &c.

INSULATED, *infulatus*, in architecture, an appellation given to fuch columns as ftand alone, or free from any contiguous wall, &c. like an ifland in the fea; whence the name. See COLUMN.

INSULT, *infultus*, in medicine, fignifies the accefs of the paroxyfm of intermitting difeafes. See the articles INTERMITTENT and PAROXYSM.

INSULT, in the art of war, the fame with affault. See the article ASSAULT.

INSUPER, over and above, a term ufed by the auditors of the exchequer in their accounts; thus, where a certain fum is charged to a perfon's account, they fay, fo much remains, infuper, to the accountant.

INSURANCE, or ASSURANCE, in law and commerce, a contract or agreement whereby one or more perfons, called infurers, affurers, &c. oblige themfelves to anfwer for the lofs of a fhip, houfe, goods, &c. in confideration of a premium paid by the proprietors of the things infured.

Infurances are of various kinds, as on fhips or parts of fhips, on merchandize fingly, and on fhips and goods jointly: and thefe are again branched out to run either for a time ftipulated, or to one fingle port, or out and home, with liberty to touch at the different places mentioned in the policy. Infurances may likewife be made on goods fent by land, or by hoys, &c. on rivers; and this is frequently done, more efpecially on jewels, and other things of great value. They may likewife be made on fhips and goods, loft or not loft, which is commonly done when a fhip has been long miffing;

miffing; and thofe words being inferted in the policy, oblige the under-writers to pay, though the fhip was loft at the time of making fuch infurance, except the affured had then certain knowledge of the fhip's being wrecked; in which cafe the fubfcription fhall not oblige, as this is accounted a mere fraud. So likewife if a perfon get more infured than the fhip is worth, with a villainous defign to deftroy her, this fraudulent act will not oblige the infurers, but expofe the proprietors to fuffer death for their knavery. If a fhip is infured from the port of London to any foreign port, and before fhe breaks ground is burnt, the infurers are not liable; unlefs the words of the infurance are, at and from the port of London; but if fhe has once broke ground, and after being driven back, takes fire, the infurers are anfwerable. An infurance made on prohibited goods is not binding, unlefs they were not prohibited till after the infurance was made. Where the policy exprefsly mentions that the fhip is to depart with convoy, it is intended that fhe fhall, if poffible, keep with the convoy during the voyage, and if fhe depart wilfully from the convoy, it is a fraud; but if having departed with convoy, fhe by ftrefs of weather lofes the convoy, and is taken, the infurers are liable. If there be thieves on board among themfelves, the mafter of the fhip is to anfwer for that, and not the infurers; for tho' the words of the policy infure againft loffes by thieves, yet affailing thieves are only here intended. An infurance made in a foreign country, may be fued in England by the common law, if the infurers come here. Where the policy is againft reftraint of princes, that does not extend to a navigation carried on againft the law of nations, or where there fhall be a feizure for not paying of cuftoms, or the like. If goods be infured as the goods of an ally, when they are the goods of an enemy, it is a fraud, and the infurance not good. If a man pays money on a policy of infurance, fuppofing a lofs where there was none, this fhall be money received for the ufe of the infurer, for which he may maintain an action. Damages happening to goods in their own nature perifhable, are not to be borne by the infurer. A fuppreffion of the truth, or a falfe allegation, is fufficient to difcharge the policy; for it is a general rule, that the infured ought to inform the infurer of all material circumftances that were come to his knowledge, at the time of making the policy, in order that the contract may be fairly adjufted; which being a contract upon chance, cannot be done, if one party knows more than the other; for equality in contracts, by the law-merchant, is effential; but a proof of an intention to make a deviation, will not avoid the policy before the deviation is actually made.

By an act made in 19 Geo. II. it is determined, that after the firft day of Auguft, 1746, no affurance fhall be made on fhips or lading by way of gaming or wagering, or without benefit of falvage to the infurer: that it fhall not be lawful to make re-affurance, unlefs the affurer fhall become infolvent, become a bankrupt, or die; in which cafes fuch affurer, or his executors, &c. may make re-affurance to the amount of the fum before affured, provided it be expreffed in the policy to be a re-affurance. That all fums of money lent on bottomry or at refpondentia, upon any fhips belonging to his majefty's fubjects, bound to or from the Eaft-Indies, fhall be lent only on the fhip or merchandize, laden, or to be laden, on board fuch fhip, and fhall be fo expreffed in the condition of the bond; and the benefit of falvage fhall be allowed to the lender, his agents or affigns, who alone fhall have a right to make affurance on the money fo lent; and no borrower of money on bottomry, &c. fhall recover more on any affurance, than the value of his intereft in the fhip or merchandize, exclufive of the money fo borrowed; and in cafe it fhall appear, that the value of his fhare in the fhip or merchandize does not amount to the full fum borrowed, fuch borrower fhall be refponfible to the lender for fo much of the money borrowed, as he hath not laid out on the fhip or merchandize, with lawful intereft for the fame, together with the infurance and all other charges, to the proportion which the money not laid out fhall bear to the whole money lent, notwithftanding the fhip and merchandize be totally loft.

Whenever advice is received of the lofs of a fhip or goods infured, application is to be made to the infurers, and the vouchers produced; and if they are fatisfied they will pay the money; but if they have caufe to fcruple the doing it, the infured muft ftay till the infurers can obtain a more fatisfactory account; but

if nothing be heard of the ſhip in any reaſonable time, the inſurers will be obliged to pay the money agreed upon. The policies made of inſurances are to be ſtamped within three days after the ſhip is inſured, on the penalty of paying 100 l. The principal offices for the inſurance of ſhips and merchandize in London, are the Royal-exchange aſſurance, and the London aſſurance, both of which are eſtabliſhed by act of parliament. Theſe offices alſo inſure houſes and other buildings, goods, wares, and merchandize, from loſs or damage by fire; and the former of them alſo aſſure lives. The Royal exchange inſurance, on a brick or ſtone building, inſures any ſum not exceeding 200 l. at 5 s. *per ann.* and any larger ſum not exceeding 1000l. after the rate of 2 s. 6 d. *per cent. per ann.* Above 1000l. and not exceeding 2000l. at 3 s. *per cent.* Above 2000 l. and not exceeding 3000 l. at 4 s. *per cent.* On goods and merchandize, the property of the aſſured, within any brick or ſtone building, or on the goods and building together, this office inſures any ſum not exceeding 300 l. for 7 s. 6 d. *per ann.* and larger ſums after the rates abovementioned: but timber or plaſter-buildings, or goods or merchandize therein, pay 8 s. *per ann.* for 200 l. and after the rate of 4 s. *per cent.* for any greater ſum not exceeding 1000 l. and 5 s. *per cent.* for all inſurances above 1000 l. and not exceeding 2000 l. On a timber or plaſter building with goods and merchandize together, any ſum not exceeding 300 l. may be inſured for 12 s. *per ann.* and larger ſums at the above rates. The goods belonging to hazardous trades, as diſtillers, chemiſts, apothecaries, colourmen, tallow-chandlers, oilmen, innholders, *&c.* depoſited in brick houſes, pay 8 s. *per ann.* for inſuring 200 l. and after the rate of 4 s. *per cent.* for any greater ſum not exceeding 1000 l; and above 1000l. and not exceeding 2000 l. 5 s. *per cent.* but when the houſes and goods are put together, the price of inſurance is 4 s. *per cent. per ann.* without any other charge except the policies.

The London inſurance has the following annual premiums.

Sums aſſured.	Common inſurances.	Hazardous inſurances.	Double hazardous inſurances.
Any ſum			
Not exceeding 200 l.	4 s. per annum.	6 s. per annum.	10 s. per annum.
From 200 l. to 1000 l.	2 s. per cent. } per an.	3 s. per cent. } per an.	5 s. per cent. } per an.
From 1000 l. to 2000 l.	2s. 6d. per ct.	4 s. per cent.	7s. 6d. per ct.
From 2000l. to 3000 l.	4s. per cent.	6 s. per cent.	7s. 6d. per ct.

The hand-in-hand office inſure for ſeven years at 12 s. per cent. on brick, and double that ſum for timber-houſes.

The ſun-fire office, beſides 7 s. 6 d. for the policy and mark, has the following annual premiums.

Sums inſured.	Common inſurances.	Hazardous inſurances.	Double hazardous inſurances.
Any ſum			
Not exceeding 200 l.	4 s. per annum.	6 s. per annum.	10 s. per annum.
From 200 l. to 1000 l.	2 s. per cent. } per an.	3 s. per cent. } per an.	5 s. per cent. } per an.
From 1000 l. to 2000 l.	2s. 6d. per ct.	4 s. per cent.	7s. 6d. per ct.
From 2000 l. to 3000 l.	3s. 6d. per ct.	5 s. per cent.	7s. 6d. per ct.

The friendly ſociety inſurance, has ſome very extraordinary regulations, the principal of which is, that every one of the aſſured becomes a member of the ſociety; and when any loſs happens, contributes in proportion to the ſum he has inſured, to make good the damage; on which account he pays only 1 s. 4 d. *per cent. per ann.* premium, and 6 s. 8 d. *per cent.* as a caution; but what is unexpended of the 6 s. 8 d. is returned to the party inſured at the end of ſeven years.

We have alſo inſurances for lives, in virtue of which, when the perſon inſured dies, a ſum of money becomes payable to the perſon on whoſe behalf the policy of inſurance was granted. The principal inſurance office of this kind, is that of the amicable ſociety for a perpetual

aſſurance, kept in Serjeant's inn, Fleet-ſtreet, London.

In this office, after paying the charges of the policy, and 10 s. entrance-money, each perſon pays 5 l. *per annum*, by quarterly payments, and from theſe payments, the dividends, which uſually amount to 100 l. and upwards, are to ariſe. All perſons admitted are to be between the ages of twelve and forty-five, and in a good ſtate of health. Any perſon is allowed to have two or three inſurances or numbers on the ſame life, whereby ſuch perſon will be intitled to a claim on each number ſo inſured; and every claimant is impowered to put in a new life, in the room of one deceaſed, within twelve kalendar months next after the end of the current year. By becoming members of this ſociety, clergymen, phyſicians, lawyers, tradeſmen, and all whoſe income ceaſes at the time of their death, may, in all probability, leave to their families a claim of not leſs than 100 l. for every 5 l. annually paid in. See the article ASSURANCE.

The value of inſurances upon lives, depends upon the probability of the continuance of any propoſed life or lives, during any propoſed term. Any queſtions of this kind may be determined from Dr. Halley's table, and from the principles of the doctrine of Chances. But, as far as we can learn of the practice on ſuch occaſions, the premiums paid to inſurers are generally higher than any computation founded on obſervations concerning the probabilities of human life, will warrant. Thus it is not unuſual to make a perſon pay 5 *per cent.* for the inſurance of his life for a twelvemonth, that is, in caſe the perſon dies within the year, the inſurer is to pay 100 l. for every 5 l. received. Now it appears from Dr. Halley's table, which eſtimates the probability of life low enough, that 5 *per cent.* is an adequate value only for a life of an advanced age, ſuch as ſixty-four.

INTACTÆ, in conics, an appellation ſometimes given to the aſymptotes. See the article ASYMPTOTE.

INTAGLIOS, precious ſtones on which are engraved the heads of great men, inſcriptions, and the like; ſuch as we frequently ſee ſet in rings, ſeals, &c.

INTAIL, or TAIL. See the article TAIL.

INTAKERS, a ſort of robbers in the north of England, who formerly received the booty which their confederates the out-partners, brought from the borders of Scotland.

INTEGER, in arithmetic, a whole number, in contradiſtinction to a fraction. See NUMBER and FRACTION.

INTEGRAL, or INTEGRANT, in philoſophy, appellations given to parts of bodies which are of a ſimilar nature with the whole: thus filings of iron have the ſame nature and properties as bars of iron.

Bodies may be reduced into their integrant parts by triture or grinding, limation or filing, ſolution, amalgamation, &c.

INDENTMENT, in law, is the intention, deſign, or true meaning of a perſon or thing, which frequently ſupplies what is not fully expreſſed: but tho' the intent of parties in deeds and contracts is much regarded by the law, yet it cannot take place againſt the rules of law.

INDENTMENT *of crimes*; this, in caſe of treaſon, where the intention is proved by circumſtances, is puniſhable in the ſame manner as if it was put in execution. So if a perſon enter a houſe in the night-time, with an intent to commit burglary, it is felony; alſo an aſſault, with an intent to commit a robbery on the highway, is made felony, and puniſhed with tranſportation. 7 Geo. II. c. 21.

INTERCALARY, *intercalaris*, in chronology, an appellation given to the odd day inſerted in leap-year; which was ſo called from *calo, calare*, to proclaim, it being proclaimed by the prieſts with a loud voice. See the article BISSEXTILE.

INTERCEPTED AXIS, in conic ſections, the ſame with abſciſſe. See ABSCISSE.

INTERCESSION, in roman antiquity, the act of a tribune of the people, or other magiſtrate, whereby he inhibited the act of another magiſtrate.

The tribunes had an unlimited power to interceed or controul the acts of every other magiſtrate, who could only inhibit the acts of inferior magiſtrates. See the article TRIBUNE.

INTERCOLUMNIATION, in architecture, denotes the ſpace between two columns, which is always to be proportioned, to the height and bulk of the columns.

Some authors have laid down the following proportions for the intercolumniations, at a medium, *viz.* in the tuſcan order, it muſt be equal to four diameters of the column below; in the doric, to three

three; in the ionic, to two; in the corinthian to two and a quarter; and in the compofite, to one and an half.

INTERCOMMONING, in law, is when the commons of two manors lie together, and the inhabitants of both have, time out of mind, caufed their cattle to feed promifcuoufly on them.

INTERCOSTAL, in anatomy, an appellation given to fuch mufcles, nerves, arteries and veins as lie between the ribs. See the article RIBS.

The intercoftal mufcles are thin flefhy plates, two between each two ribs, one external and the other internal. The intercoftal nerves are branches of the fifth and fixth pair; the intercoftal arteries are branches of the two fubclavians; and the intercoftal veins arife from the vena azygos. See the articles MUSCLE, NERVES, ARTERY, &c.

INTERDICT, an ecclefiaftical cenfure, by which the church of Rome forbids the performance of divine fervice in a kingdom, province, town, &c. This cenfure has been frequently executed in France, Italy and Germany; and in the year 1170, pope Alexander III. put all England under an interdict, forbidding the clergy to perform any part of divine fervice, except baptizing of infants, taking confeffions, and giving abfolution to dying penitents. But this cenfure being liable to the ill confequences of promoting libertinifm and a neglect of religion, the fucceeding popes have very feldom made ufe of it.

There was alfo an interdict of perfons, who were deprived of the benefit of attending on divine fervice. Particular perfons were alfo antiently interdicted of fire and water, which fignified a banifhment for fome particular offence: by this cenfure no perfon was allowed to receive them, or allow them fire or water; and being thus wholly deprived of the two neceffary elements of life, they were doubtlefs under a kind of civil death.

INTEREST, is the premium of money paid for the loan or ufe of money; and is diftinguifhed into two kinds, fimple and compound.

Simple intereft is that which is paid for the principal, or fum lent, at a certain rate or allowance made by law, or agreement of parties, whereby fo much as 5 l. or 6 l. or any other fum, is paid for 100 l. lent out for one year; and more or lefs proportionally for greater or leffer fums, and for more or lefs time. For example, if it is 5 l. to 100 l. for one year, it is 2 l. 10 s. for half a year, and 10 l. for two years: alfo 10 l. for one year of 200 l. and 5 l. for half a year; and fo on, for other fums and times. Thus, as the law, or agreement of parties, fixes a certain ratio, or, as we call it, rate of intereft, which is fo much on the 100 l. for one year; from this we can eafily find the proportional intereft on 1 l. for one year, being plainly the $\frac{1}{100}$ part of the intereft of 100 l. fo if this is 5 l. that is .05 l. if this is 6 l. that is .06 l. and if this is 5 l. 10 s. or 5.5 l. that is .055 l. Wherefore, if we underftand the rate of intereft to be the intereft of 1 l. for one year, the more common queftions about fimple intereft will relate to thefe four things, *viz.* any principal fum, its intereft, the time in which it gives that intereft, and the rate, or intereft of 1 l. for one year, according to which that principal, intereft and time are adjufted to one another.

From which we have four problems; in the rules whereof we fuppofe the principal and intereft expreffed in the denomination of pounds, by reducing what is lefs than 1 l. to a decimal of 1 l. and the time to be expreffed in years, and decimal parts of one year.

Prob. I. Having any principal fum, and time, with the rates of intereft given, to find the intereft of that fum for that time and rate.

Rule: Multiply the principal rate and time continually into one another, the product is the intereft fought.

Obferve, if we exprefs the principal by p, the intereft by n, the time by t, and the rate by r, then this rule is thus reprefented $n = p\,t\,r$.

Example: The rate of intereft being .05 l. what is the intereft of 85 l. for 4 years and 3 quarters, or 4.75 years? Anfwer. 20 l. 3 s. 9 d. = 20.1875 l. = 85 × 4.75 × .05.

Which is thus performed:

$$\begin{array}{r} 85 = p \\ 4.75 = t \\ \hline 425 \\ 595 \\ 340 \\ \hline 403.75 \\ .05 = r \\ \hline 20.1875 \text{ pounds.} \end{array}$$

Which

Which decimal is reduced by multiplying it by 20, 12, and 4: thus,

```
  .1875
     20
 ------
 3.7500 ſhillings
     12
 ------
  15000
   7500
 ------
 9.0000 pence
```

Prob. II. Having the rate, principal and intereſt, to find the time.

Rule: Divide the intereſt by the product of the rate and principal, the quote is the time: thus, $t = \frac{n}{rp}$.

Example: The rate .05 l. principal 85 l. intereſt 20 l. 3 s. 9 d. or 20.1875 l. the time is 4.75 years, or 4 $\frac{3}{4}$ years. Thus, $4.75 = \frac{20.1875}{85 \times .05}$, or $\frac{20.1875}{4.25}$.

Demonſtration: This rule is deduced from the former; thus, ſince $n = trp$, then dividing both ſides by rp, it is $\frac{n}{rp} = t$.

Prob. III. Having the principal, intereſt, and time, to find the rate.

Rule: Divide the intereſt by the product of principal and time, the quote is the rate: thus $\frac{n}{tp} = r$.

Example: $n = 20.1875$ l. $t = 4.75$ years, $p = 85$ l. then is $r = .05$ l. $= \frac{20.1875}{4.75 \times 85}$, or $\frac{20.1875}{403.75}$.

Demonſtration: Since $n = trp$, divide both by tp; it is $\frac{n}{tp} = r$.

Prob. IV. Having the rate, time and intereſt, to find the principal.

Rule: Divide the intereſt by the product of rate and time, the quote is the principal; thus, $\frac{n}{tr} = p$.

Example: $n = 20.1875$ l. $t = 4.75$ years, $r = .05$ l. then is $p = 85$ l. $= \frac{20.1875}{4.75 \times .05}$, or $\frac{20.1875}{.2375}$.

Demonſtration: Since $n = trp$, divide both ſides by tr, the quote is $\frac{n}{tr} = p$.

Scholium: If the intereſt of any ſum for any time is added to the principal, this total or ſum is called the amount, (*viz.* of the principal and its intereſt for that time.) And then from theſe four things, *viz.* the amount, which we call a, the principal, the time and rate, ariſe four problems; for having any three of theſe the fourth may always be found. Thus,

Prob. V. Having the principal, time and rate, to find the amount.

Rule: Find the intereſt by prob. I. add it to the principal, the ſum is the amount. Thus, by prob. I. the intereſt is ptr; therefore the amount is $a = ptr + p$. The reaſon is evident.

Note: Becauſe $ptr = rt \times p$, and $p = 1 \times p$; therefore $rtp + p = \overline{rt + 1} \times p = a$. And ſo the rule may be expreſſed thus; to the product of the rate and time add unity, and multiply the ſum by the principal, the product is the amount.

Example: What is the amount of 246 l. principal in 2 years and $\frac{1}{2}$, or 2.5 years, the rate of intereſt being .05 l? Anſwer 246 l. + 30.75 l. = 276 l. 15 s. for the intereſt is $= 246 \times .05 \times 2.5 = 30.75$ l. Or thus; $.05 \times 2.5 = .125$ l. to which add 1, it is $1 + .125$ l. which multiplied by 246, produces 276.75 l.

Prob. VI. Given the principal, amount and time, to find the rate.

Rule: Take the difference betwixt the principal and amount, and divide it by the product of the time and principal, the quote is the rate: thus, $r = \frac{a-p}{tp}$.

Example: Suppoſe $a = 276.75$ l. $p = 246$, $t = 2.5$ years; then is $r = .05$ l. $= \frac{276.75 - 246}{2.5 \times 246} = \frac{30.75}{615}$.

Demonſtration: Since by prob. V. $a = trp + p$, take p from both ſides, it is $a - p = trp$; then divide both by tp, it is $\frac{a-p}{tp} = r$.

Prob. VII. Given the amount, principal and rate, to find the time.

Rule: Take the difference of the amount and principal, and divide it by the product of the principal and rate, the quote is the time: thus $t = \frac{a-p}{rp}$.

Example: Suppoſe $a = 276.75$ l. $p = 246$ l. $r = .05$; then is $t = 2.5$ years $= \frac{276.75 \text{ l.} - 246}{246 \times .05} = \frac{30.75}{12.3}$.

Demonſtration: In the laſt problem, $a - p$ was equal to trp; and dividing both by rp it is $\frac{a-p}{rp} = t$.

Prob.

Prob. VIII. Given the amount, rate, and time, to find the principal.

Rule: Add 1 to the product of the rate and time, and by that sum divide the amount, the quote is the principal: thus, $p = \frac{a}{rt+1}$.

Example: $a = 276.75$ l. $r = .05$ l. $t = 2.5$ years; then is $p = 246 = \frac{276.75}{2.5 \times .05 + 1} = \frac{276.75}{1.125}$.

Demonstration: By prob. V. it is $a = \overline{rt+1} \times p$; therefore dividing both sides by $\overline{rt+1}$, it is $\frac{a}{rt+1} = p$.

Compound INTEREST, is that which is paid for any principal sum, and the simple interest due upon it for any time, accumulated into one principal sum. Example: if 100 l. is lent out for one year at 6 l. and if at the end of that year the 6 l. due of interest be added to the principal, and the sum 106 l. be considered as a new principal bearing interest for the next year (or whatever less time it remains unpaid) this is called compound interest, because there is interest upon interest, which may go on by adding this second year's interest of 106 l. to the principal 106 l. and making the whole a principal for the next year.

Now, although it be not lawful to let out money at compound interest, yet in purchasing of annuities or pensions, &c. and taking leases in reversion, it is very usual to allow compound interest to the purchaser for his ready money; and, therefore, it is very necessary to understand it.

Let therefore, as before, $p =$ the principal put to interest; $t =$ the time of its continuance; $a =$ the amount of the principal and interest; $R =$ the amount of 1 l. and its interest for one year, at any given rate, which may be thus found.

Viz. 100 : 106 :: 1 : 1,06 = the amount of 1 l. at 6 *per cent.* Or 100 : 105 :: 1 : 1,05 = the amount of 1 l. at 5 *per cent.* And so on, for any other assigned rate of interest.

Then if

R = amount of 1 l. for 1 year, at any rate.
R^2 = amount of 1 l. for 2 years,
R^3 = amount of 1 l. for 3 years,
R^4 = amount of 1 l. for 4 years,
R^5 = amount of 1 l. for 5 years,

Here $t = 5$. For 1 : R :: R : RR :: RR : RRR :: RRR : R^4 :: R^4 : R^5 ; &c. in a geometrical progression continued; that is, as 1 l. : is to the amount of 1 l. at 1 year's end :: so is that amount : to the amount of 1 l. at 2 years end, &c. Whence it is plain, that compound interest is grounded upon a series of terms, increasing in geometrical proportion continued; wherein t (*viz.* the number of years) does always assign the index of the last and highest term, *viz.* the power of R, which is R^t.

Again, as 1 : R^t :: p : $pR^t = a$ the amount of p for the time, that $R^t =$ the amount of 1 l. That is, as 1 l. : is to the amount of 1 l. for any given time :: so is any proposed principal, or sum : to its amount for the same time.

From what has been said, we presume, the reason of the following theorems will be very easily understood.

Theorem I. $pR^t = a$, as above.

From hence the two following theorems are easily deduced.

Theorem II. $\frac{a}{R^t} = p$.

Theorem III. $\frac{a}{p} = R^t$.

By these three theorems, all questions about compound interest may be truly resolved by the pen only, *viz.* without tables: though not so readily as by the help of tables calculated on purpose.

Example I. What will 256 l. 10 s. amount to in 7 years, at 5 *per cent. per annum*, compound interest?

Here is given $p = 256.5$, $t = 7$, and $R = 1.05$, which being involved until its index $= t$ (*viz.* 7) will become $R^7 = 1.40710$. Then $1.40710 \times 256.5 = 360.92115 = a = 360$ l. 18 s. 5 d. which is the answer required.

Example II. What principal or sum of money must be put out to raise a stock of 360 l. 18 s. 5 d. in seven years, at 5 *per cent per annum*, compound interest?

Here is given $a = 360.92115$, $R = 1.05$ and $t = 7$ to find p by theorem II. Thus $R^t = 1.40710$ ($360.92115 = a$) $256.5 = p$. That is, $p = 256$ l. 10 s. which is the sum or principal required.

Example III. In what time will 256 l. 10 s. raise a stock of (or amount to) 360 l. 18 s. 5 d. allowing 5 *per cent per annum*, compound interest?

Here is given $p = 256.5$, $a = 360.92115$, $R = 1.05$. To find t by theorem III. $R^t = \frac{a}{p} = \frac{360.92115}{256.5} = 1.40710$. which being continually divided by $R = 1.05$ until

until nothing remain, the number of those divisions will be $= 7 = t$.

Thus 1.05) 1.40710 (1.3400, and 1.05) (1.3400)1.2762, and 1.05(1.2762)1.2155, and so on until it becomes 1.05) 1.05 (1. which will be at the seventh division.

Therefore it will be $t = 7$, the number of years required by the question.

Example IV. If 256 l. 10 s. will amount to, or raise a stock of 360 l. 18 s. 5 d. in 7 years time, what must the rate of interest be, *per cent. per annum.*

Here is given $p = 256.5$, $a = 360.92115$; and $t = 7$; quere R. By theorem III. $\frac{a}{p} = R^t = 1.40710$; as before in the last example. And if $R^t = R^7 = 1.40710$, then $R = \sqrt[7]{1.40710}$, which may be thus extracted.

Put		
	1	$r + e = R$, then
1 ⓐ 7	2	$r^7 + 7r^6 e + 21 r^5 ee$, &c. $= R^7 = 1.40710 = G$
$2 - r^7$	3	$7r^6 e + 21 r^5 ee$, &c. $= G - r^7$
$3 \div 7r^5$	4	$re + 3ee = \frac{G - r^7}{7r^5} = D$
$4 \div r + 3e$	5	$e = \frac{D}{r + 3e}$

Let $r = 1$, then $D = 0.0575$.

Operation. $r = 1.00$)0.0575(0.05
$+ 3e = .15$) 575(

Divisor 1.15

First $r = 1.00$, $+ e = 0.05$ } $= 1.05 = R$.

Then 1 : 0.05 :: 100 : 5 the rate *per cent.* required.

INTEREST, in law, is generally taken for a chattel real, or a lease for years, *&c.* but more for a future term.

An estate in lands, *&c.* is better than a bare interest therein; yet, according to the legal sense of the word, an interest extends to estates and titles which a person has in or out of lands, *&c.* for by grant of a person's whole interest in land, a reversion, as well as possession, in simple fee, passes.

INTERJECTION, in grammar, an indeclinable part of speech, signifying some passion or emotion of the mind.

As the greatest part of the expressions used on these occasions are taken from nature alone, the real interjections, in most languages, are monosyllables; and as all nations agree in these natural passions, so do they agree in the signs and indications of them, as of love, mirth, *&c.*

The greeks confound their interjections with adverbs, and the hebrews confound them with their adverbs and prepositions, calling them all by the general name particle.

INTERIM, a name given to a formulary, or kind of confession of the articles of faith, obtruded upon the protestants after Luther's death by the emperor Charles V. when he had defeated their forces; so called because it was only to take place in the interim (mean time) till a general council should have decided all points in dispute between the protestants and the romanists. It retained most of the doctrines and ceremonies of the romanists, excepting that of marriage, which was allowed to priests, and communion to the laity under both kinds. Most of the protestants rejected it. There were two other interims, one of Leipsic, the other of Franconia.

INTERLOCUTORY ORDER, in law, an order that does not decide the cause, but only some matter incident thereto, which happens between the beginning and end of a cause; as when, in chancery or exchequer, the plaintiff obtains an order for an injunction until the hearing of the cause; which order, not being final, is called interlocutory.

INTERLOPERS, are properly those who, without due authority, hinder the trade of a company or corporation lawfully established, by dealing in the same way.

INTERLUDE, an entertainment exhibited on the theatre between the acts of a play, to amuse the spectators while the actors take breath and shift their dress, or to give time of changing the scenes and decorations.

In the antient tragedy, the chorus sung the interludes, to shew the intervals between the acts. In after times, they made use of the pantomimes to relieve the audience, that they might not grow weary of the play; a practice which can never be mentioned to their honour: for it is certain evidence of a bad taste, when the audience cannot bear to sit out a dramatic entertainment, without being relieved by such low diversions. But we have not the least reason to wonder at this,

this, who have feen, in our own time and nation, rope and ladder-dancers, and other notable artifts of this clafs, not only admitted upon the ftage, but received there with the utmoft applaufe. Interludes now are generally fongs, dances, or concerts of mufic. Ariftotle and Horace give it for a rule, that interludes fhould confift of fongs founded on the principal parts of the drama.

INTERLUNIUS MORBUS, the fame with the epilepfy. See EPILEPSY.

INTERMEDIATE, is ufually underftood of the fpace of time elapfed from any certain point to any other.

INTERMEWING, in falconry, is a hawk's mewing, from the firft change of her coat, till fhe turn white.

INTERMITTENT, or INTERMITTING FEVERS, fuch fevers as go off and foon return again, in oppofition to thofe which are continual. See FEVER.

Thefe fevers are diftinguifhed into various claffes, according to the interval of time between the relapfe into them, as tertian fever, quartan fever, &c. See the articles TERTIAN, QUARTAN, &c.

It may be obferved, that intermittents in general are either vernal, and rage from February till Auguft; or autumnal, and rage from Auguft to February. Fevers of this kind begin with an ofcitation, pandiculation, wearinefs, weaknefs, cold, horror, rigor, tremor, and palenefs of the extremities, a difficult refpiration, an anxiety, a naufea, a vomiting, a quick, weak, and flow pulfe. The more violent and numerous thefe fymptoms are, the worfe the fever is; and afterwards, the heat and other fymptoms are the worfe. This is the firft ftage of intermittent fevers, which correfponds to the increafe of continual fevers, and is of all other ftages the moft dangerous: for in this condition, the urine is generally crude and thin. This ftage of intermittent fevers is fucceeded by another, which begins with heat, rednefs, a ftrong, large, and free refpiration, a fmall anxiety, a large and ftrong pulfe, an exceffive thirft, a pain in the limbs and head, generally a rednefs of the urine: this ftage correfponds to the ftate and height of continual fevers. Then laft of all, there generally appears a profufe fweat, a remiffion of all the fymptoms, a thick urine, with a fediment refembling black duft, fleep, a total abfence of the fever, laffitude, and weaknefs.

Intermittent fevers frequently terminate in thofe of the acute and dangerous kind, which is generally owing to an exceffive heat, and too brifk a motion of the fluids. The cure requires that we fhould ufe aperient, faline, alkaline, aromatic, mineral, diluting, mild, and oleaginous fubftances, heat, motion, fomentation, and friction, during the intermiffion, or in the firft ftage; the medicines of this kind are all Tachenius's falts of herbs: the moft confiderable of which are obtained from wormwood, carduus benedictus, and ftalks of beans, nitre, antimoniated nitre, diaphoretic antimony unwafhed, fal ammoniac, fal prunella, and fal polychreftus, tartarus regeneratus, tartarus tartarifatus, falt of tartar, reduced to a faponaceous mafs with oil of turpentine, and all the parts of all the aromatic herbs, efpecially of thofe which are refolvent. In order to purge the primæ viæ from the redundant fordes, a purge or a vomit is often beneficial, exhibited fo long before the paroxyfm that its operation may be over before the fit comes on.

That an intermitting fever, fays Dr. Mead, is not carried off by the peruvian bark with a proper degree of certainty, without premifing a vomit, or a purge, or both, is not unknown to phyficians; but to join fome mild cathartic to this remedy will perhaps appear new in practice. For it is commonly thought among us, that this medicine has little or no effect, unlefs the patient be coftive while he takes it; but long experience has taught me, continues the doctor, that it is quite neceffary to add a fmall quantity of rhubarb to this febrifuge, fo as to procure two ftools at leaft every day; nor have I ever obferved that this procedure has leffened its virtue, but rather rendered it more efficacious.

However, the doctor obferves, that it fometimes happens that this febrifuge fails in true intermittents, which failure he afcribes generally to a bad habit of body, in which cafe the phyfician fhould ufe his beft endeavours to difcover in what part the fault lies; and it will be commonly found to be in the vifcera and glands of the abdomen. Upon this account, he thinks it neceffary to prefcribe fome purges, and fometimes vomits; and in the intermediate days, deobftruents and ftomachics; the beft of which are aromatic bitters, and preparations of fteel.

INTERNAL, in general, fignifies whatever is within a thing.

Euclid (lib. I. prop. 32.) proves, that the

the sum of the three angles of every triangle is equal to two right angles; whence he deduces several useful corollaries. See the article TRIANGLE.

He likewise deduces, from the same proposition, this theorem, *viz*, that the sum of the angles of every rectilinear figure, is equal to twice as many right angles, as the figure hath sides, excepting or subtracting four.

INTERNODIUM, among botanists, denotes the space between two knots or joints of the stalks of barley, oats, and the like plants.

INTEROSSEUS, in anatomy, an appellation given to the muscles which move the figures and toes, from their being situated between the bones of those parts. See MUSCLE, FLEXOR, *&c.*

INTERPOLATION, among critics, denotes a spurious passage, inserted into the writings of some antient author.

One great rule with regard to the expunging interpolations, is, that the restitution be perfectly agreeable to the rest of the work.

INTERPRETER, in general, denotes a person who explains the words or writings of another, so as to make them intelligible to those who did not understand them before.

INTERREGNUM, the time during which the throne is vacant, in elective kingdoms; for in such as are hereditary, like ours, there is no such thing as an interregnum.

INTERREX, the magistrate who governs during an interregnum.

In antient Rome, this magistrate was continued even after the expulsion of their kings.

INTERRMENT, the act of burying the dead. See the article BURIAL.

INTERROGATION, *or point of* INTERROGATION, in grammar, a character of this form (?) serving to denote a question.

INTERROGATION, in rhetoric, is a figure, whereby the orator proposes something by way of question; which, it must be owned, greatly enlivens the discourse.

INTERROGATORIES, in law, are questions wrote down, and demanded of the witnesses examined in a cause, more especially in the court of chancery. These interrogatories must relate only to the necessary point, and be either drawn up or perused, and also signed by counsel: but care must be taken, that they are not calculated to lead a person in what he has to say, by putting words as it were into his mouth, as, did you not see such a thing done? the depositions taken upon such interrogatories will be suppressed; for they ought not to lean to one side more than another, and therefore should be expressed after this manner, did you see or not see? The examiners, and also the commissioners who examine the witnesses produced on interrogatories, must examine only one interrogatory at a time, and not ask any idle questions, or set down impertinent answers.

INTERRUPTION, in matters of proportion, signifies the same with disjunction, or disjunct proportion. See the article DISCRETE.

Interruption is noted thus, (: :) and intimates the breaking off the ratio in the middle of four disjunct or discrete proportionals; as, A : B : : C : D, that is as A is to B, so is C to D. See the articles PROPORTION, RATIO, *&c.*

INTERRUPTION is likewise a figure in rhetoric, wherein a person, to shew his passion, breaks off his discourse suddenly and abruptly.

INTERSECTION, in the mathematics, signifies the cutting of one line or plane by another: thus, we say, that the mutual intersection of two planes is a right line. See LINE and PLANE.

INTERSOILING, in husbandry, is laying one kind of soil or mould upon another, as clay on sand, sand on earth, *&c.*

INTERSPINALES *colli*, in anatomy, small fleshy muscles of the neck, arising from the superior parts of each double spinal process of the neck, except of the second vertebra; and inserted into the inferior parts of all the double spines. When these muscles act, they draw the spines of the vertebræ of the neck nearer each other.

INTERSTELLAR, a word used by some authors to express those parts of the universe that are without and beyond our solar system.

In the interstellar regions are supposed to be several other planetary systems moving round each fixed star as the center of their motion, as the sun is that of ours. And if it be true, as is not improbable, that each fixed star may be thus a sun to some habitable orbs that may move round it, the interstellar world will be infinitely the greater part of the universe.

INTERTIES, in architecture, those small pieces of timber that lie horizontally between the sommers, or between them and the sell, or reson.

INTER-

INTERTRANSVERSALES *colli* in anatomy, certain mufcles fituated among the tranfverfe apophyfes of the vertebræ: they arife from the lower vertebra, and are inferted into that next above: they are of the fame fize and figure with the interfpinales.

INTERVAL, in mufic, the difference between two founds, in refpect of acute and grave; or, that imaginary fpace terminated by two founds, differing in acutenefs or gravity.

When two or more founds are compared in this relation, they are either equal or unequal in the degree of time: fuch as are equal are called unifons, with regard to each other, as having one tune; the other, being at a diftance from each other, conftitute what we call an interval in mufic; which is properly the diftance in time between two founds.

Intervals are diftinguifhed into fimple and compound.

A fimple interval, is without parts or divifions. Such are the octave, and all that are within it; as the fecond, third, fourth, fifth, fixth, and feventh, with their varieties.

A compound interval, confifts of feveral leffer intervals: fuch are all thofe greater than the octave: as the ninth, tenth, eleventh, twelfth, *&c.* with their varieties.

Table of intervals, fimple and compound.

1	2	3	4	5	6	7	Simple	Intervals
8	9	10	11	12	13	14	Double	Compound Intervals.
15	16	17	18	19	20	21	Triple	
22	23	24	25	26	27	28	Quadruple.	
29	30	*&c*						

Thofe in the upper line are the fimple intervals, the other three the compound ones, *i. e.* fuch as are either doubled, tripled, or quadrupled.

To reduce a compound interval to a fimple one, Mr. Broffard gives this rule: From the denominator thereof take feven, and what remains is the fimple interval; as from a thirteenth take feven, there remains fix, which fhews the thirteenth to be the fixth doubled: again, from twenty-fix take feven three times, which are twenty-one, and five remains; therefore, fays he, the twenty-fixth appears to be the fifth quadrupled.

But this diftinction, into fimple and compound, regards practice only, becaufe there is really no fuch thing as a leaft interval. Befides by a fimple interval here, is not meant the leaft practifed, but fuch as tho' it were equal to two or more leffer, which are in ufe; yet, when we would make a found move fo far up and down, we always pafs immediately from one of its terms to the other.

What is meant then by a compound interval, will be very plain; it is fuch whofe terms are in practice, taken either in immediate fucceffion, or fuch where the found is made to rife and fall from the one to the other, by touching fome intermediate degree; fo that the whole becomes a compofition of all the intervals from one extreme to the other.

What we now call a fimple interval, the antients called diaftem; and our compound one, they called fyftem. Each of thefe has differences; even of the fimple, there are fome greater and fome leffer, but they are always difcord; but of the compound or fyftem, fome are concord, and others difcord. Unifons, 'tis plain, cannot poffibly have any variety; for when there is no difference, as in unifonance, which flows from a relation of equality, 'tis evident there can be no diftinction: unifons therefore are often called concords, (tho' they may not properly be fo called.) But an interval depending on a difference of time, or a relation of inequality, admits of variety; and fo the terms of every interval, according to their particular relation or difference, make either concord or difcord. Some indeed have reftrained the word concord to interval, making it include a difference of tune: But this is precarious; for as the word concord fignifies an agreement of founds, it is certainly applicable to unifons in the firft degree. Intervals, 'tis plain, may differ in magnitude, and there may be an infinite variety, according to the poffible degrees of tune; for there is no difference fo great or fo little, but a greater or leffer may poffibly be conceived: 'tis true, with regard to practice, there are limits which are the greateft and leaft intervals our ears can judge of, and which may actually be produced by voice or inftrument.

The degrees of tune are proportionable to the number of vibrations of the ſonorous body, in a given time; or the velocity of their courſes and recourſes. Now theſe differences in tune conſtitute, as has been already ſaid, the intervals in muſic; theſe therefore muſt be greater or leſſer, as the differences are; and 'tis the quantity of theſe, which is the ſubject of the mathematical part of muſic.

Theſe intervals are meaſured, not in the ſimple differences or arithmetical ratios of the numbers expreſſing their vibrations or lengths; but in their geometric ratios, and vice verſa: it is however to be obſerved, that in comparing the equality of the intervals, the ratios expreſſing them, muſt be all of one ſpecies, otherwiſe this abſurdity would follow, that the ſame two ſounds may make different intervals. To determine in general, which of two or more intervals is the greateſt, take all the ratios as proper fractions, and the leaſt fraction will be the greateſt interval.

The antients were extremely divided about the meaſuring of intervals. Pythagoras and his followers meaſured them by the ratios of numbers. They ſuppoſed the differences of gravity and acuteneſs to depend on the different velocities of the motions that cauſe ſound; and thought therefore, that they could only be accurately meaſured by the ratios of thoſe velocities; which ratios were firſt inveſtigated by Pythagoras, on occaſion of his paſſing by a ſmith's ſhop, and obſerving a concord between the ſound of the hammers ſtriking on the anvil. Ariſtoxenus oppoſed this: he thought reaſon and mathematics had nothing to do in the caſe, and that ſenſe was the only judge in the diſpute; the other being too ſubtile, to be of any uſe. He therefore determined the octave, fifth and fourth, which are the moſt ſimple concords, by the ear; and by the difference of the fourth and fifth, he found out the tone, which he ſettled as an interval the ear could judge of; he alſo meaſured every interval by various additions and ſubſtractions, made of thoſe mentioned one with another. Ptolemy keeps a middle way between the two; he finds fault with one for deſpiſing reaſon, and with the other for excluding ſenſe; and ſhews how theſe two might mutually aſſiſt each other in this matter. Ariſtoxenus ſays, there are two principal differences in intervals; the firſt is that of magnitude, and the other as being concord and diſcord; for, ſays he, every concord differs in magnitude from every diſcord; which may be interpreted, that every interval is of a different compaſs or extent from another. As concords and diſcords, intervals have many differences; but of theſe, magnitude is the principal. But Euclid reckons five differences of intervals, firſt in magnitude; ſecond, in kind; third, in being either concord or diſcord; fourth, in being ſimple or compounded; and laſtly, rational or irrational. Firſt then, intervals differ in magnitude, in which reſpect ſome are called minor, ſuch as ditonus, triemitonium, tonus, hemitonium, and dieſis; others major, as diateſſaron, diapente, and diapaſon. In the genus or kind, intervals differ, as being either diatonic, chromatic, or enharmonic, *i. e.* divided as each of theſe require. As concords and diſcords they differ; the concords are diateſſaron, diapente, diapaſon, and the like; and all intervals leſs than a fourth or diateſſaron, are diſſonant, as well as thoſe ſituated between the concords. And laſtly, they differ as to rational and irrational: rational intervals are ſuch as we can diſtinguiſh by numbers, as the tone, hemitonium, ditonus, tritone, &c. The irrational are ſuch whoſe magnitudes vary in an irrational manner, *i. e.* ſo that we cannot fix a certain proportion between their two extremes in numbers.

But in the modern ſyſtem of muſic, intervals are founded on certain ratios or proportions expreſſible in numbers, which may all be analyſed into the prime numbers 2, 3, and 5. And all intervals may be found from the octave, fifth, and third major, which reſpectively correſpond to thoſe numbers. Theſe are the muſician's elements, from the various combinations of which, all the agreeable variety of relations of ſounds reſult. And Dr. Pepuſch, in the Phil. Tranſ. nº 481, aſſures us, it may be looked on as the ſtandard of truth; and that every interval that occurs in muſic is good or bad, as it approaches to, or deviates from what it ought to be on theſe principles. Mr. Euler, in his Nov. Theor. Muſ. defines an interval, the meaſure of the difference of an acute and grave ſound: thus, ſuppoſe three ſounds *a*, *b*, *c*, of which *c* is the moſt acute, *a* the moſt grave, and *b* the intermediate ſound. It appears, that the interval between the

ſound

founds a and c, is the aggregate of the intervals between a and b, and between b and c. Therefore, if the interval between a and b, be equal to that between b and c, which happens when $a : b :: c : d$; the interval between a to c, will be double the interval a to b, or b to c. This being confidered, it will appear that intervals ought to be expreffed by the meafures of the ratios, conftituting the founds forming thofe intervals: but ratios are meafured by the logarithms of fractions, the numerators of which denote the acute founds, and the denominators the grave. Hence the interval between the founds a and b, will be expreffed by the logarithm of the fraction $\frac{b}{a}$ which is ufually denoted by $L\frac{b}{a}$; or, which comes to the fame, by $Lb-La$. The interval therefore of equal founds, a to a, will be null, as $La-La=0$. The interval called an octave, or diapafon, will be expreffed by the logarithm of 2; and the interval of the fifth or diapente, will be $L\frac{3}{2}=L\,3-L\,2$. From whence it appears, that thofe intervals are incommenfurable; fo that no interval, however fmall, can be an aliquot part, both of the octave and fifth. The like may be faid of the intervals $L\frac{4}{3}$ and $L\frac{5}{4}$, and others whofe logarithms are diffimular. But intervals expounded by logarithms of numbers, which are powers of the fame root, may be compared. Thus the interval of the founds 27 : 8, will be the interval of the founds 9 : 4, as 3 is to 2: for $L\frac{27}{8}=3\,L\frac{3}{2}$, and $L\frac{9}{4}=2\,L\frac{3}{2}$. Euler. *ibid.* p. 74. But tho' the logarithms of numbers, which are not powers of the fame root, be incommenfurable, yet an approximating ratio of fuch may be found. Thus, the meafure of the octave is $L\,2=0.3010300$, and the meafure of the fifth is $L\,3-L\,2=0.1760913$. Hence the interval of the octave will be to that of the fifth, nearly as 3010300 to 1760913; which ratio being reduced to fmaller terms, will give us thefe fimpler expreffions for the ratio of the octave and fifth, 2 : 1, 3 : 2, 5 : 3, 7 : 4, 12 : 7, 17 : 10, 29 : 17, 41 : 24, 53 : 31, which laft is very near the truth. Euler. *ibid.* p. 75. In like manner, intervals may be divided into any number of equal parts: for this purpofe we need only divide the logarithm of the propofed interval into the fame number of parts, and then find its correfponding number by the tables. The ratio of the number fo found, to unity, will give the required ratio of the divided interval to its propofed part. Thus let the third part of an octave be required; its logarithm will be $=0.1003433=\frac{1}{3}L\,2$: the ratio correfponding nearly to this, will be 63 : 50, or lefs accurately, 29 : 23, or 5 : 4, which laft expreffes the third major; and this is by the lefs knowing taken for the third part of an octave, and feems to be fuch on our harpfichord and organs, where from C to E is a third, from E to G♯ another, and from G♯ or A♭ to c, another third. But the more intelligent know, that G♯ and A♭ ought not to be reputed the fame found, fince they differ by a diefis enharmonica, which is nearly equal to two commas.

INTERVALS, in gardening and hufbandry, the fpaces left between the feveral rows of plants fown or fet in gardens or fields. See the article HUSBANDRY.

INTESTATE, in law, a perfon that dies without making a will; in which cafe, a diftribution of his perfonal eftate, after his debts and funeral charges are paid, is to be made among the wife and children of the deceafed, or for want of fuch, among the next of kin. Here the ftatute, immediately upon the inteftate's death, vefts an intereft in the perfons intitled, fo that if one dies before the diftribution, his fhare is to go to his executors and adminiftrators, and not to the furvivors of the next akin to the inteftate. See the article ADMINISTRATOR.

INTESTINES, in anatomy, long cylindrical, hollow, and membranaceous bodies; or rather, one fuch continued body, or tube, reaching from the ftomach to the anus.

In thefe we are to obferve, 1. Their length, which is ufually fix times the height of the perfon they belong to. 2. Their wonderful circumvolutions, and the ufes of them. 3. Their connection by means of the mefentery, with the vertebræ of the loins. 4. Their number, which tho' properly, as already obferved, but one, yet is it ufually made fix, whereof three are called the fmall inteftines, inteftina tenuia, *viz.* the omentum, jejunum, and ilium; and the other three, the larger inteftines, inteftina craffa, *viz.* the cœcum, colon, and rectum. See OMENTUM, JEJUNUM, *&c.*

The ftructure and fubftance of the inteftines are membranaceous; being formed, in every part, of five coats or tunices

The first is the common coat, from the peritonæum, and is membranaceous. The second is cellular, and is called by late writers, tunica cellulosa Ruyschii; it is continuous with the mesentery, and is to be discovered by inflating it: this coat, in fat animals, frequently contains abundance of fat. The third is muscular; it is composed of a double series of fibres, in part longitudinal, and in part annular; and these assist the motion of the guts. The fourth coat is nervous: it is furnished with abundance of cellules, vascules, and glands, and is thicker than the others: from this arise the rugæ, and the valves of the intestines. The fifth is the villose coat, which sustains the terminations of the excretory vessels, and the beginnings of the lacteals: hence, when nicely examined, it has the appearance of a sieve: it is the organ of percolation of the chyle.

The intestines have vessels in great abundance, running over every part of their substance. Their arteries are from the meseriac ones; the upper meseriac serving for the smaller intestines, the lower for the larger; and these make a multitude of very singular and surprizing anastomoses. The veins are meseriacs, and go off to the vena portæ and the liver. The nerves are sent from the intercostals, and the par vagum. And beside these we are to observe the lacteal vessels. See the article LACTEAL.

The rectum, it is to be observed, receives blood-vessels also from the hypogastrics. There are also, besides the brunnerian glands of the duodenum, other glands in the intestines, called from the name of the person who discovered them, glandulæ Peyeri. These, in the small guts, are usually little, congregate, and miliary; but sometimes they are single. They are larger as they are nearer to the duodenum, and smaller as they approach towards the great guts. Their office is to discharge into the intestines a liquor, which serves for the attenuation of the chyle, and for the lubricating of the intestines. In the larger guts, and in the vermiform appendage, they are single and large, of a lenticular figure; and they are largest of all in the rectum. They have mouths, out of which there is secreted a fluid, which serves to lubricate the sides of the intestines, and to soften the fæces, that they may be evacuated without pain.

The use of the smaller guts is to promote the formation of the chyle, to perfect its secretions, and to propel the remaining fæces to the larger. The office of the larger guts is to receive and collect the matter of the fæces, and at a proper time to expel it. See CHYLE.

In the annexed plate of the intestines, *a, a,* (plate CXLVI. fig. 3. n° 1.) represent the liver turned upwards, in order to shew the gall-bladder *b*. The cystic duct, marked *c*, uniting with the hepatic duct *d*, forms the ductus communis choledocus *e*. The vena portæ is marked *f*; some small branches of the hepatic artery, *g*; the umbilical vein, *h*; the stomach, with its coronary vessels, *i, i, i*; the spleen, *k*; a portion of the omentum, with some of the adipose glands, *l, l, l*; the windings of the small intestines, *m, m, m*; part of the colon, *n, n, n*; the muscular fascia of the colon, *o, o, o*; the extremity of the colon, *p*, where it makes a flexure in order to form the rectum, *q*; the extremity of which, marked *r*, is called the anus. The sphincter-muscle of the anus, is marked *s*; and its elevators, *t, t*.

N° 2. *ibid.* represents the oesophagus, marked A; the stomach, marked B; the pancreas, marked C, C; the pancreatic duct, marked D; and the duodenum, marked E.

Falling out of the INTESTINES. See the article HERNIA.

Inflammation of the INTESTINES. See the article INFLAMMATION.

Wounds of the INTESTINES, especially of the small guts, admit of little or no hopes of a cure; yet as the great guts sometimes admit of the suture to advantage, it is better to use a doubtful remedy than none: besides that, by this means, the discharge of the chyle and fæces into the cavity of the abdomen, which would occasion great mischief, is prevented.

Small wounds of the intestines, not exceeding the size of a goose-quill, should by no means be stitched, but left to nature; as they frequently unite much sooner this way, than if irritated by the suture. But large wounds are to be stitched up with the glover's suture, before the intestine is returned.

To perform this, you are to be provided with a small needle, threaded with silk; an assistant should take hold of one part of the gut by a fine piece of linnen well aired,

aired, while the furgeon fhould hold the other part in his left hand, and few up the whole wound after the glover's manner, leaving very fmall fpaces, not more than the twelfth of an inch each, between each of the ftitches. The laft ftitch fhould be faftened with a knot, but the other end muft hang about a foot out of the abdomen, by means of which the filk may be drawn out when the inteftine is healed. After this is performed, the wound of the abdomen is next to be taken care of, and ftitched up, keeping the lower or depending part of the wound open with a tent, till all the preternatural fluids are difcharged out of the cavity of the abdomen, and till the union of the wound in the inteftine fhall give leave to draw away the filk with which the future was performed on it. See the article GASTRORAPHY.

As the modern furgeons, however, have found that few are faved who have received any large wound in the inteftines, and that in thofe few who do recover, the wounded parts, from the finenefs of the coat of the gut, do not properly unite, but rather adhere to the inner part of the peritoneum, or to the omentum, or to fome other of the inteftines, they rather choofe now to let alone the operation of the future of the gut, and fubftitute a gentler method of cure. They pafs a waxed thread through a fine needle, and with this they faften the wounded part of the inteftine to the internal orifice of the wound in the abdomen. The thread that in this cafe hangs out of the abdomen, is to be fo firmly fixed by the application of fticking-plaifters to the wound, that the inteftine cannot recede from the part to which it was faftened, nor can it evacuate any of its contents into the cavity of the abdomen. When this operation is well performed, the inteftine eafily adheres to the internal part of the abdomen, and the patient fuffers infinitely lefs pain and hazard, than from the former way of making the future. The fame method of cure alfo is the proper one for wounds of the ftomach, where they are within the reach of the hand, and it is fometimes crowned with fuccefs. Where any part of the inteftines is carried away, the cafe is plainly defperate; yet fome of the late eminent furgeons having obferved, that the lips of the inteftines, fo wounded, would fometimes unexpectedly adhere to the wound in the abdomen, took this hint from nature toward a cure in fuch defperate cafes. Whenever, therefore, a furgeon is called in a cafe of this kind, after diligently examining the ftate of the upper part of the inteftine which has fuffered the lofs of fubftance, he fhould ftitch it to the external wound; for by this means the patient may not only be faved from inftant death, but there have been inftances where the wounded inteftine has been fo far healed, that the fæces which ufed to be voided by the anus, have been voided by the wound in the abdomen. And this, tho' from the neceffity of wearing a tin or filver pipe, or keeping cloaths conftantly upon the part to receive the excrement, may feem to be very troublefome; yet it is furely far better to part with one of the conveniencies of life, than to part with life itfelf; befides, the excrements that are voided by this paffage, are not fo offenfive in fmell, as thofe voided per anum.

The fame method of cure may conveniently alfo be put in practice, where any part of the inteftine is mortified, by having been thruft out of the abdomen; for in this cafe if you tie up the mefenteric arteries, the corrupted or mortified part of the inteftine may be cut off, and the remaining found part made to adhere to the wound of the abdomen. And it is furely better to try this method and fave if it be only a few by it, than to leave all in this unhappy fituation to perifh without help.

INTESTINAL, fomething belonging to, or feated in the inteftines. See the preceding article.

Heifler gives the name of inteftinal fever to a fpecies of fever called by others mefenteric. See MESENTERIC.

To this fpecies he alfo refers the dyfenteric, catarrhal, and petechial fevers. See FEVER, DYSENTERY, PETECHIÆ, &c.

INTRADA, ENTRY, in the italian mufic, is much the fame with prelude or overture. See the article PRELUDE.

INTRANSITIVE, a grammatical term for fuch verbs as are otherwife called neuter verbs. See the article VERB.

INTRENCHMENT, or RETRENCHMENT, in the art of war. See the article RETRENCHMENT.

INTRIGUE, or INTREAGUE, an affemblage of events or circumftances, occurring in an affair, and perplexing the perfons concerned in it.

In

In this ſenſe, it is uſed to ſignify the nodus or plot of a play or romance; or that point wherein the principal characters are moſt embarraſſed, through the artifice and oppoſition of certain perſons, or the unfortunate falling out of certain accidents and circumſtances.

In tragedy, comedy, or an epic poem, there are always two deſigns; the firſt and principal is that of the hero of the piece. The ſecond contains the deſigns of all thoſe who oppoſe him: theſe oppoſite cauſes produce oppoſite effects; to wit, the efforts of the hero for the execution of his deſign, and the efforts of thoſe who thwart it. As thoſe cauſes and deſigns are the beginning of the action, ſo theſe efforts are the middle, and there form a knot or difficulty which we call the intrigue, that makes the greateſt part of the poem. It laſts as long as the mind of the reader or hearer is ſuſpended about the event of thoſe oppoſite efforts: the ſolution or cataſtrophe commences when the knot begins to unravel, and the difficulties and doubts begin to clear up.

The intrigue of the Iliad is twofold, the firſt comprehends three days fighting in Achilles's abſence, and conſiſts on the one ſide in the reſiſtance of Agamemnon and the Greeks, and on the other in the inexorable temper of Achilles. The death of Patroclus unravels this intrigue, and makes the beginning of a ſecond. Achilles reſolves to be revenged, but Hector oppoſes his deſign; and this forms the ſecond intrigue, which is the laſt day's battle.

In the Æneid there are alſo two intrigues, the firſt is taken up in the voyage and landing of Æneas in Italy; the ſecond is his eſtabliſhment there: the oppoſition he met with from Juno in both theſe undertakings, forms the intrigue.

As to the choice of the intrigue, and the manner of unravelling it, it is certain they ought both to ſpring naturally from the ground and ſubject of the poem. Boſſu gives us three manners of forming the intrigue of a poem; the firſt is that already mentioned; the ſecond is taken from the fable and deſign of the poet; in the third the intrigue is ſo laid, as that the ſolution follows from it of courſe.

INTRINSIC, a term applied to the inner, real, and genuine values, properties, &c. of any thing, in oppoſition to their extrinſic or apparent values, &c. See the article EXTRINSIC.

INTRUSION, in law, obtains where an anceſtor dies ſeiſed of an eſtate, or inheritance which is expectant upon an eſtate for life, and the tenant for life dies; after which a ſtranger enters before the heir, in which caſe he is ſaid to intrude. Bracton ſays, that intruſion ſignifies any unlawful entry upon lands, &c. by a perſon who has no right to the ſame, in prejudice of the perſon to whom they are legally deſcended. The difference between an intruder and an abator, according to Fitzherbert, is this, *viz.* that an abator enters into lands, &c. void by the death of a tenant in fee, whilſt an intruder enters upon lands void by the death of a tenant for life or years. An entry on the king's lands and poſſeſſions upon the death of a tenant, &c. is termed intruſion againſt the king, for which an information may be exhibited; tho' before office is found, he that occupies the land ſhall not be an intruder, and yet the king is entitled to the profits thereof after the tenant's eſtate is ended.

INTRUSION DE GARD, was a writ formerly in uſe, where an infant or perſon within age entered upon his lands, and kept out his lord.

INTRUSIONE, is a writ which lies againſt an intruder at the ſuit of him that has the fee, &c. If a perſon has only an eſtate-tail, he may not have this writ, but is to bring a writ of formedon.

INTUITION, among logicians, the act whereby the mind perceives the agreement or diſagreement of two ideas, immediately by themſelves, without the intervention of any other; in which caſe, the mind perceives the truth as the eye doth the light, only by being directed towards it. Thus the mind perceives that white is not black, that three are more than two, and equal to one and two. See the article IDEA.

This part of knowledge, ſays Mr. Locke, is irreſiſtible, and, like the ſun-ſhine, forces itſelf immediately to be perceived as ſoon as ever the mind turns its view that way. It is on this intuition that all the certainty and evidence of our other knowledge depends; this certainty every one finds to be ſo great, that he cannot imagine, and therefore cannot require, a greater. See the articles JUDGMENT, KNOWLEDGE, DEMONSTRATION, &c.

INVALID, a perſon wounded, maimed, or diſabled for action by age, &c.

For

For the colleges or hospitals built for the reception and accommodation of invalids, or soldiers or seamen worn out and disabled in the service, see the articles College and Hospital.

INVECTED, in heraldry, denotes a thing fluted or furrowed.

Invected is just the reverse of ingrailed, in which the points are turned outward to the field, whereas in invected they are turned inward to the ordinary, and the small semicircles outward to the field. See plate CXLV. fig. 5.

INVECTIVE, in rhetoric, differs from reproof, as the latter proceeds from a friend, and is intended for the good of the person reproved; whereas the invective is the work of an enemy, and entirely designed to vex and give uneasiness to the person against whom it is directed.

INVENTION, denotes the act of finding any thing new, or even the thing thus found.

Invention is, according to lord Bacon, of two very different kinds, the one of arts and sciences, the other of arguments and discourse: the former he sets down as absolutely deficient. That the other part of knowledge is wanting, says he, seems clear; for logic professes not, nor pretends to invent either mechanical or liberal arts; nor to deduce the operations of the one, or the axioms of the other: but only leaves us this instruction, "To believe every artist in his own art." His lordship further maintains, that men are hitherto more obliged to brutes than reason for inventions. Whence those who have written concerning the first inventors of things, and origin of sciences, rather celebrate chance than art, and bring in beasts, birds, fishes and serpents, rather than men, as the first teachers of arts. No wonder, therefore, as the manner of antiquity was to consecrate the inventors of useful things, that the Egyptians, to whom many arts owe their rise, had their temples filled with the images of brutes, and but a few human idols amongst them. As to the invention of arts, continues our author, we are rather beholden to the wild goat for chirurgery, to the nightingale for music, to the stork for clysters, to the accidental flying off of a pot's cover for artillery, and, in a word, to chance, or any thing else, rather than logic.

Invention is therefore used for a subtilty of mind, or somewhat peculiar in a man's genius, which leads him to the discovery of things new; whence we say a man of invention.

Invention, according to Du Bos, is that part which constitutes the principal merit of works, and distinguishes the great genius from the simple artist.

Invention, in rhetoric, being one of the second divisions of invention, according to Bacon, signifies the finding out and choosing of arguments which the orator is to use for proving his point, or moving his hearers passions.

This invention, in the opinion of that philosopher, cannot properly be called invention, which is the discovery of things not yet known, and not the recollecting things that are known; the only use and office of this rhetorical invention being out of the stock of knowledge already laid up, to select such articles as make for the purpose. The same author divides the method of procuring a stock of matter for discourse into two; the first of which is either by marking out and indicating the parts wherein a thing is to be searched after, which he calls the topical way; and the second is by laying up arguments for use that were composed before hand, and which he calls the promptuary way. For the method of invention, see the article Method.

Cicero wrote four books upon invention, whereof two only are remaining. Invention, according to this author, is the principal part of oration.

Invention, in poetry, is applied to whatever the poet adds to the history of the subject he has chosen, as well as to the new turn he gives it.

Invention, in painting, is the choice which the painter makes of the objects that are to enter the composition of his piece.

M. Felibien gives the general name invention to every thing that depends on the genius of the painter, as the ordonnance, the disposition of the subject, and even the subject itself, when it is new. He also distinguishes invention into two kinds, that which arises immediately from the mind of the painter, and that which he borrows from some other: the first is when he absolutely invents the subject himself; and the second, when he borrows it from history, fable, &c.

Mr. de Piles observes, that invention is different from disposition, and that it is those

those two things together that form composition; for after having made a good choice of objects proper for the subject, they may be ill disposed, and then, tho' the invention be ever so good, the disposition will be faulty, and the piece will displease.

INVENTION is also used for the discovery of a thing hidden. Hence,

INVENTION *of the holy cross*. See the article *Invention of the* CROSS.

INVENTORY in law, *&c.* is a schedule containing all the goods and chattels of a deceased person that belonged to him at the time of his death, together with the value of the same, as appraised by two or more indifferent persons.

Executors, as well as administrators, are to deliver in upon oath to the ordinary indented inventories, one part of which is to remain with the ordinary, and the other part with the executor or administrator. This is required for the benefit of the creditors and legatees, that the executor or administrator may not conceal any part of the personal estate from them. The statute ordains, that the inventory shall be exhibited within three months after the person's decease; yet it may be done afterwards, for the ordinary may dispense with the time, and even with its being ever exhibited, as in cases where the creditors are paid, and the will is executed.

INVERARY, a parliament town of Scotland, in the county of Argyle, of which it is the capital, situated on Lochfin, forty-five miles north-west of Glasgow: west longitude 5°, north latitude 56° 28′.

INVERNESS, a parliament and port-town of Scotland, the capital of the county of Inverness, situated at the mouth of the river Ness: west long 4°, north lat. 57° 46′.

INVERSE, is applied to a manner of working the rule of three, or proportion, which seems to go backward, or contrary to the order of the common or direct rule. See the articles RULE OF THREE and PROPORTION.

INVERSE *method of fluxions*. See FLUXION.

INVERSION, the inverting or turning any thing backwards.

INVERSION, in grammar, is where the words of a phrase are ranged in a manner not so natural as they might be.

It is a considerable beauty either in verse or prose, when we have it from an able hand; it gives vigour and variety to a sentence, and keeps the mind in an agreeable suspence and expectation of a marvellous turn and conclusion.

INVERURY, a parliament-town of Scotland, in the county of Aberdeen, situated on the river Don, ten miles west of Aberdeen.

INVESTIGATION, properly denotes the searching or finding any thing out by the tracts or prints of the feet; whence mathematicians, schoolmen, and grammarians, come to use the term in their respective researches.

Investigation of a theme, in grammar, is the finding out the primitive tense, mood, and person of any verb, far removed from its source. To understand a greek author, it is absolutely necessary to be well acquainted with the method of investigating a theme. This theme, in the greek tongue, is the present tense of the indicative mood.

Clenard was the first who introduced this term into grammar; he gives the title *investigatio thematis* to that part where he teaches the manner of finding whence any person or tense of a verb proceeds, and of reducing it to its primitive word, or finding its indicative.

INVESTITURE, in law, a giving livery of seisin or possession. There was antiently a great variety of ceremonies used upon investitures; as at first they were made, by a certain form of words; and afterwards, by such things as had the greatest resemblance to the thing to be transferred: thus where lands were intended to pass, a turf, *&c.* was delivered by the granter to the grantee. In the church, it was customary for princes to make investiture of ecclesiastical benefices, by delivering to the persons they had chosen, a pastoral staff and a ring.

INULA, in botany, a genus of the syngenesia-polygamia-superflua class of plants, with radiated flowers: the receptacle is naked; the down is simple; and the antheræ terminate in setæ at their bases.

INVOCATION, in theology, the act of adoring God, and especially of addressing him in prayer for his assistance and protection. See the articles ADORATION and PRAYER.

The difference between the invocation of God and of the saints, as practised by the papists, is thus explained in the catechism of the council of Trent. "We "beg of God, says the catechism, to "give us good things, and to deliver us "from evil; but we pray to the saints,

"to intercede with God, and obtain "those things which we ftand in need "of. Hence we ufe different forms in "praying to God, and to the faints: "to the former we fay, hear us, have "mercy on us; to the latter we only "fay, pray for us." The council of Trent exprefsly teaches, that the faints who reign with Jefus Chrift, offer up their prayers to God for men, and condemn thofe who maintain the contrary doctrine. The proteftants reject and cenfure this practice as contrary to fcripture, deny the truth of the fact, and think it highly unreafonable to fuppofe that a limited finite being fhould be in a manner omniprefent, and at one and the fame time hear and attend to the prayers that are offered to him in England, China, and Peru; and from thence infer, that if the faints cannot hear their requefts, it is inconfiftent with common fenfe to addrefs any kind of prayer to them.

INVOCATION, in poetry, an addrefs at the beginning of a poem, wherein the poet calls for the affiftance of fome divinity, particularly of his mufe, or the deity of poetry.

The invocation is faid to be abfolutely neceffary in an epic poem, as the poet relates things which he could not be fuppofed to know, unlefs he were infpired by fome deity. Befides, it ferves his readers as an example of piety, which ought to be the foundation of his whole work. Add to this, that the gods are to have a part in the action, and it is not decent he fhould fet them to work without firft afking them leave.

In the courfe of an epic poem, it is true, feveral invocations occur, particularly when any thing extraordinary comes to be related; as when Virgil defcribes the metamorphofis of Æneas's fleet into fea nymphs: but the firft invocation is always the moft confiderable.

In the invocation, Boffu confiders two things; the firft is what the poet requefts; and the fecond, to what deity he addreffes his requeft. As to the firft, Homer has fo clofely joined the invocation to the propofition, that he feems to invoke his mufe for the whole work. Virgil, on the contrary, only requefts his mufe to furnifh him with a part of his fubject: he even mentions the particular part, in which he defires her affiftance; and after propofing his matter, in all its extent, he begs the mufe to acquaint him with the caufe of it.

As to the deity invoked, the fame author obferves, that it muft always be the divinity that prefides over poetry in general, or that which prefides over the particular fubject of the work. Ovid's invocation in his metamorphofis, and likewife Lucretius's, is of this latter kind; thofe of Homer and Virgil are of the former: they only invoke the mufes, and thus diftinguifh between the divinities who prefide over poetry, and thofe who prefide over the actions of the poem, and have parts in it. Lord Shaftfbury obferves, that an invocation appears cold from a modern poet.

INVOICE, an account in writing of the particulars of merchandife, with their value, cuftom, charges, *&c.* tranfmitted by one merchant to another in a diftant country.

One copy of every invoice is to be inferted verbatim in the invoice-book, for the merchant's private ufe; and another copy muft, immediately upon fhipping off the goods, be difpatched by poft, or otherwife, to the correfpondent. This copy is commonly drawn out upon a fheet of large poft paper, to the end of which is fubjoined a letter of advice.

It muft here be obferved, that when a merchant fhips off goods for his own account, the invoice fent to the factor contains only the quantity of goods, but nothing of the coft and charges; and the letter fubjoined confifts of inftructions fignifying in what manner the employer inclines to have his goods difpofed of, and returns made.

INVOICE-BOOK, this book is paged, and contains copies of the invoices of goods fent to fea: for as a merchant is obliged to fend his correfpondent an invoice of all the goods he configns to him, fo it is reafonable that he fhould keep a copy of it for himfelf. For the further ufes of invoice-books, fee BOOK *of invoices*.

INVOLUCRUM, among botanifts, that fort of calyx or cup, which furrounds a number of flowers together, every one of which has, befides this general cup, its own particular perianthium. See the article CALYX.

The involucrum confifts of a number of little leaves, difpofed in a radiated manner.

INVOLUTION, in algebra, the raifing of a quantity from its root to any power affigned

aſſigned. See the articles QUANTITY and POWER.

Any ſimple quantity is involved by multiplying the exponent by that of the power required: thus, to raiſe, any ſimple quantity to its ſecond, third, fourth, &c. power, is only to multiply its exponent 1, by 2, 3, 4, &c. and, in general, the power expreſſed by m, of any quantity, is had by multiplying its exponent by m. Thus, the ſecond power of a is $a^{2\times 1} = a^2$; its third power, or cube, is $a^{3\times 1} = a^3$; and the mth power of a is $a^{m\times 1} = a^m$. Alſo the ſquare of a^4 is $a^{2\times 4} = a^8$; the cube of a^4 is $a^{3\times 4} = a^{12}$; and the mth power of a^4 is $a^{4\times m}$. The ſquare of abc is $a^2 b^2 c^2$, the cube is $a^3 b^3 c^3$, and the mth power is $a^m b^m c^m$.

The coefficients muſt alſo be raiſed to the ſame power by a continual multiplication of itſelf by itſelf, as often as unit is contained in the exponent of the power required. Thus, the ſquare of $3a$ is $3 \times 3 \times a^2 = 9a^2$: and the cube of $3ab$ is $3 \times 3 \times 3 \times a^3 b^3 = 27 a^3 b^3$.

As to the ſigns, when the quantity to be involved is poſitive, it is obvious that all its powers muſt be poſitive too; and when the quantity to be involved is negative, then all its powers whoſe exponents are even numbers muſt be poſitive, and thoſe whoſe exponents are odd numbers negative; becauſe any number of multiplications of a negative, if that number be even, gives a poſitive. The power then can only be negative when its exponent is an odd number, though the quantity to be involved be negative. Thus the powers of $-a$ are $+a^2$, $-a^3$, $+a^4$, $-a^5$, $+a^6$, &c. thoſe powers whoſe exponents are 2, 4, 6, &c. being poſitive; but thoſe whoſe exponents are 1, 3, 5, &c. negative.

The involution of any compound quantity is performed by a continual multiplication of it by itſelf, as in the binomial $a+b$. Thus,

$$\begin{array}{l}
a+b = \text{root} \\
\times\ a+b \\
\hline
a^2 + ab \\
\quad + ab + b^2 \\
\hline
a^2 + 2ab + b^2 = \text{the ſquare, or ſecond power.} \\
\times\ a+b \\
\hline
a^3 + 2a^2 b + ab^2 \\
\quad + a^2 b + 2ab^2 + b^3 \\
\hline
a^3 + 3a^2 b + 3ab^2 + b^3 = \text{cube, or third power.} \\
\times\ a+b \\
\hline
a^4 + 3a^3 b + 3a^2 b^2 + ab^3 \\
\quad + a^3 b + 3a^2 b^2 + 3ab^3 + b^4 \\
\hline
a^4 + 4a^3 b + 6a^2 b^2 + 4ab^3 + b^4 = \text{biquadratic, or fourth power.} \\
\times\ a+b \\
\hline
a^5 + 4a^4 b + 6a^3 b^2 + 4a^2 b^3 + ab^4 \\
\quad + a^4 b + 4a^3 b^2 + 6a^2 b^3 + 4ab^4 + b^5 \\
\hline
a^5 + 5a^4 b + 10a^3 b^2 + 10a^2 b^3 + 5ab^4 + b^5 = \text{the fifth power.} \\
\times\ a+b \\
\hline
a^6 + 5a^5 b + 10a^4 b^2 + 10a^3 b^3 + 5a^2 b^4 + ab^5 \\
\quad + a^5 b + 5a^4 b^2 + 10a^3 b^3 + 10a^2 b^4 + 5ab^5 + b^6 \\
\hline
a^6 + 6a^5 b + 15a^4 b^2 + 20a^3 b^3 + 15a^2 b^4 + 6ab^5 + b^6 = \text{ſixth power, \&c.}
\end{array}$$

If the powers of $a-b$ are required, they will be found the ſame as the preceding; only the terms, in which the exponent of b is an odd number, will be negative, becauſe an odd number of multiplications of a negative produces a negative: thus, the cube of $a-b$ will be found to be $a^3 - 3a^2 b + 3ab^2 - b^3$; where the ſecond and third term are negative, the exponent of b being an odd number in theſe terms. In general, the terms of any power of $a-b$ are poſitive and negative by turns. But the reader will find a general theorem, for raiſing a binomial to any power required,

required, under the article BINOMIAL.

If a quantity, confifting of three or more terms, is to be involved, it may be diftinguifhed into two parts, which are to be raifed to any power in the fame manner as a binomial; and then, by the fame rules, you may fubftitute, inftead of the powers of thefe compound parts, their values: thus, $\overline{a+b+c}^2 = \overline{\overline{a+b}+c}^2 = \overline{a+b}^2 + 2c \times \overline{a+b} + c^2 = a^2 + 2ab + b^2 + 2ac + 2bc + c^2$. And, $\overline{a+b+c}^3 = \overline{a+b}^3 + 3c \times \overline{a+b}^2 + 3c^2 \times \overline{a+b} + c^3 = a^3 + 3a^2b + 3ab^2 + b^3 + 3a^2c + 6abc + 3b^2c + 3ac^2 + 3bc^2 + c^3$.

In thefe examples, $a+b+c$ is confidered as compofed of the compound part $a+b$, and the fimple part c; and then the powers of $a+b$, are formed by the binomial theorem, and fubftituted for $\overline{a+b}^3$, and $\overline{a+b}^2$.

The reverfe of involution is called evolution, or the extraction of roots; that is, the finding the roots of the powers of any quantity, whether fimple or compound. See the article EXTRACTION.

JOACHIMITES, in church-hiftory, the difciples of Joachim a ciftertian monk, who was an abbot of Flora in Calabria, and a great pretender to infpiration.

The joachimites were particularly fond of certain ternaries: the Father, they faid, operated from the beginning till the coming of the Son; the Son, from that time to theirs, which was the year 1260; and from that time the Holy Spirit was to operate in his turn. They alfo divided every thing relating to men, to doctrine, and the manner of living, into three claffes, according to the three perfons in the trinity: the firft ternary was that of men; of whom the firft clafs was that of married men; which had lafted during the whole period of the Father; the fecond was that of clerks, which had lafted during the time of the Son; and the laft was that of the monks, in which there was to be an uncommon effufion of grace by the Holy Spirit: the fecond ternary was that of doctrine, *viz.* the Old Teftament, the New, and the everlafting Gofpel; the firft they afcribed to the Father, the fecond to the Son, and the third to the Holy Spirit: a third ternary confifted in the manner of living, *viz.* under the Father, men lived according to the flefh; under the Son, they lived according to the flefh and the fpirit; and under the Holy Ghoft, they were to live according to the fpirit only.

JOANNA, one of the iflands of Comoro, fituated between the north-weft part of Madagafcar and Zanguebar, in Africa: eaft long. 45°, fouth lat. 12°.

JOB, or *Book of* JOB, a canonical book of the Old Teftament, containing a narrative of a feries of misfortunes which happened to a man whofe name was Job, as a trial of his virtue and patience; together with the conferences he had with his cruel friends, on the fubject of his misfortunes, and the manner in which he was reftored to eafe and happinefs. This book is filled with thofe noble, bold, and figurative expreffions, which conftitute the very foul of poetry.

Many of the jewifh rabbins pretend that this relation is altogether a fiction: others think it a fimple narrative of a matter of fact, juft as it happened: while a third fort of critics acknowlege that the groundwork of the ftory is true, but that it is wrote in a poetical ftrain, and decorated with peculiar circumftances, to render the narration more profitable and entertaining.

The time is not fet down, in which Job lived. Some have thought that he was much antienter than Mofes, becaufe the law is never cited by Job or his friends, and becaufe it is related that Job himfelf offered facrifices. Some imagine that this book was wrote by himfelf; others fay, that Job wrote it originally in fyriac or arabic, and that Mofes tranflated it into hebrew: but the rabbins generally pronounce Mofes to be the author of it, and many chriftian writers are of the fame opinion.

The worfhip of Job is of great antiquity among the Greeks and Latins: the Greeks celebrate this feftival on May 6, and the latins keep it on the fame month. A great number of churches and chapels are dedicated to this holy man, particularly in Spain and Italy; and he is invoked principally againft the leprofy, the itch, the foul difeafe, and the like diftempers.

JOBBER, in law, a perfon that buys and fells cattle for others. Hence ftock-jobbers are perfons who buy and fell ftocks for other perfons.

JOEL, or *the Prophecy of* JOEL, a canonical book of the Old Teftament. Joel was the fon of Pethuel, and the fecond of the twelve leffer prophets. The ftyle of this prophet is figurative, ftrong, and expreffive.

five. He upbraids the Iſraelites for their idolatry, and foretells the calamities they ſhould ſuffer, as a puniſhment of that ſin; but he endeavours to ſupport them with the comfort that their miſeries ſhould have an end, upon their reformation and repentance.

IOGUIS, among the eaſt-indians, a kind of hermits, who generally ſtand under trees, or near their pagods. Some of them go ſtark naked, holding their arms acroſs over their heads, and continue in that poſture all their lives: others lie on the ground with one leg higher than the other, and their arms raiſed above their head; and theſe wretched penitents inſenſibly loſe the uſe of their arms and legs: ſome confine themſelves in cages, ſet on the top of a thick ſtake, fixed in the ground, and theſe cages are ſo ſmall, that they put the penitent to prodigious torture: ſome holding a ſabre in one hand, and a kind of ſhield in the other, go up a kind of crane, where hooking themſelves to an iron, which runs a conſiderable way into their backs, they ſpring forward into the air, flouriſhing their ſabres, and launching out into extravagant praiſes of their idols: and others plunge into the Ganges, in hopes of being devoured by a crocodile, fancying that by this means they ſhould obtain the happineſs of the next life.

Theſe miſerable wretches are conſidered by the Indians as perfect models of piety and holineſs: they are followed by perſons of both ſexes, who make a vow of devoting themſelves to their ſervice, and are wholly employed in ſoothing their voluntary ſufferings by offering them alms and refreſhments. They call the pious to their devotions by ringing a little bell; and when they hold their ſpiritual converſations, they ſit cloſe in a ring, and ſet up a banner, made of ſeveral pieces of ſtuff, faſtened at the end of a ſtick.

JOHN, or *Goſpel of St.* JOHN, a canonical book of the New Teſtament, containing a recital of the life, actions, doctrine, and death of our Saviour Jeſus Chriſt, written by St. John the apoſtle and evangeliſt. See the article GOSPEL.

St. John wrote his Goſpel at Epheſus, after his return from the iſle of Patmos, at the deſire of the chriſtians of Aſia. St. Jerom ſays, he would not undertake it, but on condition they ſhould appoint a public faſt, to implore the aſſiſtance of God; and that the faſt being ended, St. John, filled with the Holy Ghoſt, broke out into theſe words, "In the beginning "was the word," &c. The antients aſſign two reaſons for this undertaking: the firſt is, becauſe, in the other three Goſpels, there was wanting the hiſtory of the beginning of Jeſus Chriſt's preaching, till the impriſonment of John the Baptiſt; which, therefore, he applied himſelf particularly to relate. The ſecond reaſon was, in order to remove the errors of the cerinthians, ebionites, and other ſects.

St. JOHN'S DAY, the name of two chriſtian feſtivals, one obſerved on June 24. kept in commemoration of the wonderful circumſtances attending the birth of St. John the Baptiſt; and the other on Dec. 27, in honour of St. John the Evangeliſt.

Chriſtians of St. JOHN. See CHRISTIANS.

St. JOHN'S BREAD, *ceratonia*, in botany. See the article CERATONIA.

St. JOHN'S WORT, a plant called by authors hypericum. See HYPERICUM.

Sweet JOHNS, in botany, a name ſometimes given to the pink.

St. JOHN'S, in geography, one of the Philippine-iſlands, ſituated in 126° eaſt long. and 7° north lat.

St. JOHN'S is alſo an iſland in the bay of St. Lawrence, ſituated north of New Scotland: weſt longitude 65°, north latitude 47°.

JOIGNY, a town of Champaign, in France, thirty miles ſouth-weſt of Troyes.

JOINDER, or JOYNDER, in law, ſignifies a joining of two perſons in the ſame action: as for inſtance, if there are two joint-poſſeſſors of goods, and theſe are taken from one of them, they may both join in an action to recover them. An action againſt the owner of a ſhip, on account of goods damaged, muſt be brought againſt all of them: and where there are ſeveral partners in trade, and one has the management, actions muſt be brought againſt all the partners jointly. In actions perſonal, ſeveral wrongs may be joined in one writ; yet this cannot be done where ſome things are founded on a tort, and ſome on a contract, becauſe they require a different plea and a different proceſs. However, a general action of treſpaſs, and a ſpecial action on the caſe, may be joined in one action; and any actions may be joined, in which the plea, not guilty, goes to all.

JOINERY, the art of working in wood, or of fitting various pieces of timber together.

It is called by the French *menuiſerie, q. d.* ſmall work, to diſtinguiſh it from carpentry,

pentry, which is employed about large and less curious works. See the article CARPENTRY.

In the annexed plate (CXLVII.) are represented the tools employed in this art; where A is a work-bench; *b*, the hook; *c*, the screw; *d*, the hold-fast; *a*, *a*, *a*, holes in the legs of the bench; *e*, *e*, mallets; B, B, B, *&c.* planes of several sorts; where B 1 is called a fore-plane; B 2, a jointer; B 3, a strike-block; B 4, a smoothing-plane; B 5, a rabbet-plane; B 6, the plough: C, C, C, chissels of several sorts; C 1 and C 3 being called formers; C 2, a paring-chissel; C 4, a skew-former; C 5, a mortess-chissel; C 6, a gouge: D is a square, *a* being called the handle; *b*, the tongue; *c*, the outer square; and *d*, the inner square: E, E, hand-saws; F, the bevil, with its tongue moveable upon a center; G, a gage; H, a piercer; *a* being its head; *b*, the pad; *c*, the stock; and *d*, the bit: I, a gimblet; K, an augre; *a a* being its handle; and *b*, its bit; L, a hatchet; M, a frame or bow-saw; N, a whip-saw; O, a tenant saw; Q, a compass-saw; R, a hammer; and S, a foot-rule, to measure their work with.

JOINT, in general, denotes the juncture of two or more things.

The joints of the human body are called by anatomists articulations. See the article ARTICULATION.

The term joint is also applied to the separation between the stones or bricks of a building, usually filled with mortar, plaster, or cement: also by carpenters, to the several manners of assembling or fitting pieces of wood together; as a dove-tail joint, *&c.*

Stiffness of the JOINTS, in surgery and medicine, sometimes proceeds from the bones being broken, bruised, or wounded, especially about the extreme parts, which being kept in one posture, in order for cure, the synovia of the joints becomes thick, and depraves or quite abolishes its motion; or it may proceed from the bony juice proceeding from broken bones, and insinuating itself into the joint. Hoffman says, diseases of the joints sometimes proceed from spasms of the ligaments.

If difficulty of motion proceeds from long rest, it is to be treated with emollient and resolving fomentations, ointments, oils, and the hot fat of animals, often rubbed upon the joint; at the same time using a gentle flexure, till the motion is gradually restored. If these will not do, then warm emollient baths must be used, or hot-bath-waters, till the inspissated liquor is dissolved, and the motion as much as possible restored. If it proceeds from the juice of broken bones, or the nodus gout, it is generally incurable, if the former remedies will not do.

JOINT-EXECUTORS, in law, are when two or more persons are appointed such by will; in which case they are accounted but as one single person, so that the actions done by one of them are taken to be the acts of all, because they all represent the person of the testator: thus, where two joint executors are possessed of a lease for years, in right of their testator, one of them may sell the term without the others joining; and in like manner, where one joint-executor gives a release, the others is bound by it, each having an authority over the whole estate: but a joint-executor is not charged with the acts of his companion, any farther than he is actually possessed of the goods of the testator; however, if joint-executors enter into an agreement, that each shall intermeddle with particular parts of the testator's estate, in that case, each becomes chargeable for the whole, by agreement. It has been held, that two joint-executors cannot plead separate pleas, because their testator, if living, on an action brought against him, could have been allowed but one plea; and that if all the executors are not named in an action brought by joint-executors, the action will abate. As to legatees, the receipt of one executor charges not the other.

JOINT-LIVES, in law, is where any thing is granted or given to two or more during their lives.

JOINT-TENANTS, are such as hold lands or tenements jointly by one title; as where a man grants lands, *&c.* to two persons and their heirs; such persons, during their joint tenancy, must jointly plead, as well as be jointly sued, which is common to them with coparcenars of lands. See the article COPARCENARS.

Every joint-tenant in an estate has a right to his own share, and may give lease or forfeit the same; he may make a lease, but not a deed of feoffment, or grant, to any besides his companion. Joint-tenants cannot singly dispose of more than the part that belongs to them; for where they join in any gift or grant of lands, in the judgment of the law, each gives but his respective part: therefore, if one joint-tenant grants a rent-charge out of his part, after his death the survivor shall have the whole land discharged, because the

the land will be his by furvivorfhip: but where a leafe for years is made by a joint-tenant, it cannot be avoided by the furvivor. Sometimes joint-tenants enter into covenants, not to take advantage of each other by furvivorfhip; and, indeed, they, as well as tenants in common of inheritance, are bound by ftatute to make partition, in the fame manner as coparcenars.

JOINTURE, in law, generally fignifies a fettlement of lands and tenements, made on a woman in confideration of marriage. See the article MARRIAGE.

It alfo fignifies a covenant, by which the hufband, or fome friends of his, affures lands, &c. to his wife for the term of her life. See the article ANNUITY.

Here it is obfervable, that an eftate fettled in jointure, which comes from the anceftors of the wife, and is not of the purchafe of the hufband, or fome anceftor of his, will not be accounted a good jointure. Where no eftate of inheritance is referved to the hufband and his heirs, but the eftate is granted to the wife for life, or in tail, the remainder to a ftranger; this will not be a legal jointure, although the fame is made by the hufband or his anceftor.

In order to make a perfect jointure agreeable to the ftatute 27 Hen. VIII. cap. x. feveral things are to be obferved: 1. That it be made to take effect for the wife's life, either in poffeffion or profit, prefently after the deceafe of her hufband. 2. That it be for the term of her own life, or for a greater eftate: it may however be limited to continue no longer than fhe remains a widow, &c. 3. That it be expreffed to be in fatisfaction of her whole dower, and not a part thereof. 4. That, though it may be made either before or after marriage, yet, if before, the wife cannot wave it, and claim her dower at common law: but if made afterwards, fhe may, at the death of her hufband. It is here faid, that all other fettlements in lieu of jointures, that are not purfuant to this ftatute, are jointures at common law, and no bars to claim of dower. See DOWER.

Upon the hufband's death, the wife may enter on her jointure, and is not driven to a real action, as fhe is to recover dower at common law. Wherefore, on a lawful eviction of her jointure, fhe fhall be endowed according to the rate of her hufband's lands, of which fhe was entitled to dower by the common law; and fhould fhe be evicted of part of her jointure, fhe fhall have dower for fo much thereof. A hufband committing treafon fhall not occafion a forfeiture of the wife's jointure; yet feme-coverts committing the fame, or felony, are liable to forfeit their jointures; and upon conviction of recufancy, they incur the forfeiture of two parts of three in their jointures, as well as dowers.

JOINTURESS, or JOINTRESS, the perfon on whom a jointure is fettled. See the preceding article.

Where an eftate, fettled on a wife, is a jointure by law, and the jointrefs makes any alienation thereof, either by fine, feoffment, &c. with another hufband, fuch alienation fhall be a forfeiture of the eftate fo fettled, as a jointure: but a jointrefs may, by leafe, demife and grant an eftate for forty years, &c. if fhe live fo long, or for life, without incurring a forfeiture. In cafe the jointrefs covinoufly fuffers a recovery to bar the heir, he may enter prefently upon the lands, &c.

JOINVILLE, a town of Champaign, in France, fituated on the river Marne: eaft longitude 5° 15′, and north latitude 48° 27′.

JOISTS, or JOYSTS, in architecture, thofe pieces of timber framed into the girders and fummers, on which the boards of the floor are laid.

Joifts are from fix to eight inches fquare, and ought feldom to lie at a greater diftance from each other than ten, or, at moft, twelve inches, nor ought they ever to bear a greater length than ten feet, or to be lefs into the wall than eight inches.

All joifts on the back of a chimney ought to be laid with a trimmer, at fix inches diftance from the back.

Some carpenters furr their joifts, as they call it; that is, they lay two rows of joifts, one over another, the undermoft of which are framed level with the under fide of the girder; and the uppermoft, which lie crofs the lower ones, lie level with the upper fide of the girder.

JONAH, or *Prophecy of* JONAH, a canonical book of the Old Teftament, in which it is related, that Jonah was ordered to go and prophecy the deftruction of the Ninevites; but that difobediently attempting a voyage another way, he was difcovered by the rifing of a fudden tempeft, and caft into the fea, where he was fwallowed up by a whale, which having lodged him three days and three nights in his belly, difgorged him upon the fhore; whereupon being fenfible of his paft danger and furprifing deliverance, he betook

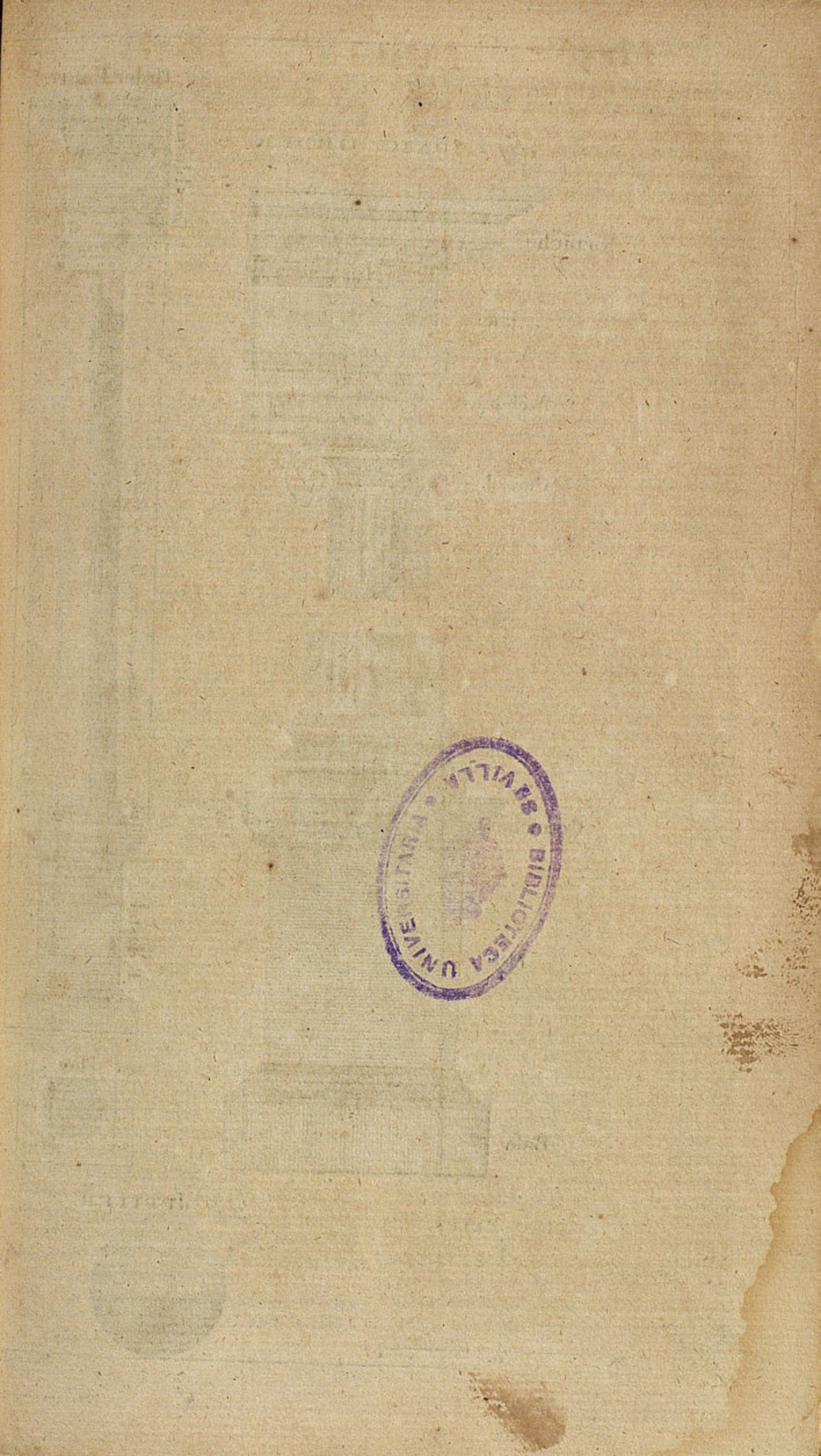

BIBLIOTECA UNIVERSITARIA
SEVILLA

Fig. 1. IONIC ORDER.

Corniche
Frieze
Architrave
Capital
Shaft
Base
Corniche
Dye
Base

Order Entire.

Entablature
Capital
Column containing 9 of its diameters
Base
Pedestal
Plan
Height proposed 28 Modules ½ divided into nineteen parts.

Fig. 2. ISOSCELES.

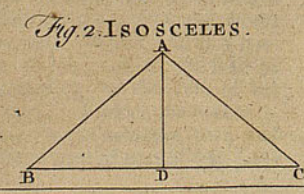


Fig. 3. JUPITER.



betook himſelf to the journey and embaſſy, to which he was appointed; and arriving at Nineveh, the metropolis of Aſſyria, he, according to his commiſſion, boldly laid open to the inhabitants, their ſins and miſcarriages, and proclaimed their ſudden overthrow; upon which the whole city, by prayer and faſting, and a ſpeedy repentance, happily averted the divine vengeance, and eſcaped the threatened ruin.

IONIA antiently was a province of the leſſer Aſia, or Natolia, bounded by Etolia on the north, Lydia on the eaſt, Caria on the ſouth, and the Archipelago on the weſt.

IONIC ORDER, the third of the five orders of architecture, being a kind of mean between the robuſt and delicate orders. See plate CXLVIII. fig. 1.

The firſt idea of this order was given by the people of Ionia, who, according to Vitruvius, formed it on the model of a young woman of an elegant ſhape, dreſſed in her hair; whereas the doric had been formed on the model of a ſtrong robuſt man. The ionic order is diſtinguiſhed from the compoſite, in that it has none of the acanthus-leaves in its capital; and from the tuſcan and doric, by the channels and flutings in its ſhaft.

The capital of this order is adorned with volutes, and its corniche with dentiles. The proportions of the ionic pillar, as they are taken from the famous one in the temple of Fortuna Virilis at Rome, now the church of St. Mary the Egyptian, are theſe: 1. The entire order from the ſuperficies of the area to the corniche, are twenty-two modules, or eleven diameters. 2. The column with its baſe contains eighteen modules. 3. The entablature contains four modules. 4. The volute of the capital is of an oval form. 5. The columns in this order are often hollowed, and furrowed with twenty-four gutters or channels, called flutings: theſe flutings are not always concave from the top of the ſhaft to the bottom, but for that third of it next the baſe, they are filled up with a kind of rods or canes; and in the other two thirds they are left hollow, or ſtriated, in imitation of the folds or plaits of a garment.

When this order was firſt invented, its height was but ſixteen modules; but the antients, to render it ſtill more beautiful than the doric, augmented its height, by adding a baſe to it.

Mr. Le Clerc makes its entablement four modules and ten minutes, and its pedeſtal ſix entire modules; ſo that the whole order makes twenty-eight modules ten minutes.

This order is at preſent uſed properly in churches and religious houſes, courts of juſtice, and other places of tranquility and devotion.

This order has one advantage above any of the reſt, which conſiſts in this, that the fore and hind parts of its capital are different from its ſides; but this is attended with an inconvenience, when the ordonnance is to turn from the front of the building to the ſide; to obviate which, the capital may be made angular, as is done in the temple of Fortuna Virilis. Scamozzi, and ſome other modern architects, have introduced the upper part of the compoſite capital, in lieu of the ionic, imitating that of the temple of Concord, whoſe four ſides are alike. To render it a little more beautiful, the volute may be made a little oval and inclining.

For the baſe, corniche, freeze, and pedeſtal of this order, ſee the articles BASE, CORNICHE, &c.

IONIC DIALECT, in grammar, a manner of ſpeaking peculiar to the people of Ionia. At firſt it was the ſame with the antient attic; but paſſing into Aſia, it did not arrive at that delicacy and perfection to which the athenians attained. The Ionians generally changed the α into η, as σοφια into σοφιη: they put the η and ι for ε, and αιη for η, as αγγηιον for αγγειον: αναγκαιη for αναγκη: they alſo change α and ει into ηϊ, αυ into ωϋ, ει into εα and εε, ευ into ω and ηϋ, and εο into ευ, as ῥηδιος into ῥηϊδιος, αληθεια into αληθηϊη, θαυμα into θωϋμα, αυτος into ωϋτος, ποιεισθαι into ποιεεσθαι, ημεις into ημεες, &c. they alſo inſert the ι and υ, as ςεινος for ςενος, and πουλυς for πολυς.

IONIC SECT was the firſt of the antient ſects of philoſophers; the others were the italic and eleatic. The founder of this ſect was Thales, who being a native of Miletus in Ionia, occaſioned his followers to aſſume the appellation of ionic: Thales was ſucceeded by Anaximander, and he by Anaximenes, both of Miletus; Anaxagoras Clazomenius ſucceeded them, and removed his ſchool from Aſia to Athens, where Socrates was his ſcholar. It was the diſtinguiſhing tenet of this ſect that water was the principle of all natural things.

IONIC TRANSMIGRATION was antiently a very celebrated epocha; it took its riſe from the retreat of the athenian colonies, who, upon the death of Codrus, put them-

themſelves under the command of his ſon Neleus, and eſtabliſhed the twelve cities of Ionia in Aſia. Theſe colonies, according to Eratoſthenes, were eſtabliſhed 50 years after the return of the Heraclidæ; and, according to Marſham, 77 years after the taking of Troy.

JOVIAL, *jovialis*, among chemiſts, *&c.* ſomething belonging to tin, as the bezoardicum joviale. See the articles BEZOARDICUM and TIN.

JONK, or JONQUE, in naval affairs, is a kind of ſmall ſhip, very common in the Eaſt indies: theſe veſſels are about the bigneſs of our fly boats; and differ in the form of their building, according to the different methods of naval architecture uſed by the nations to which they belong. Their ſails are frequently made of mats, and their anchors are made of wood.

JOSHUA, a canonical book of the Old Teſtament, containing a hiſtory of the wars and tranſactions of the perſon whoſe name it bears. This book may be divided into three parts; the firſt of which is a hiſtory of the conqueſt of the land of Canaan; the ſecond, which begins at the twelfth chapter, is a deſcription of that country, and the diviſion of it among the tribes; and the third, compriſed in the two laſt chapters, contains the renewal of the covenant he cauſed the Iſraelites to make, and the death of their victorious leader and governor. The whole comprehends a term of ſeventeen, or, according to others, of twenty-ſeven years.

JOURNAL, a day-book, regiſter, or account of what paſſes daily.

JOURNAL, or DAY BOOK, among merchants, is that wherein the tranſactions, recorded in the waſte-book, are prepared to be carried to the ledger, by having their proper debtors and creditors aſcertained and pointed out, for a more diſtinct account of which, ſee BOOK.

JOURNAL, at ſea, is a regiſter, kept by the pilot and others, wherein notice is taken of every thing that happens to the ſhip from day to day, with regard to the winds, the rhumbs, the rake, ſoundings, *&c.* and in order to enable him to adjuſt the reckoning, and determine the place where the ſhip is.

For the method of correcting a journal at ſea, by making proper allowances for the lee-way, variation, *&c.* ſee LEE-WAY, VARIATION, RECKONING, *&c.*

The remarkable occurrences of the whole day being finiſhed in the log-book, if the latitude by account agree with the latitude by obſervation, the ſhip's place will be truly determined; if not, then the reckoning muſt be corrected, before it be placed in the journal. See LOG BOOK. The form of the journal, together with an example of two days work, is as follows. N. B. To expreſs the days of the week the ſeamen commonly uſe in their books the characters by which the ſun and planets are expreſſed, *viz.* ☉ denoting Sunday, ☽ Monday, ♂ Tueſday, ☿ Wedneſday, ♃ Thurſday, ♀ Friday, and ♄ Saturday.

A Journal from the Lizard towards Jamaica, in the ſhip Neptune, J. M. commander.

Week Days.	Months. Years.	Month Days.	Winds.	Direct Courſe.	Miles. Diſt.	Latitude correct.	Whole diff. Lon. made.	Bearings and diſt. from the Lizard.	Remarkable obſervations and accidents.
☽			N b E E b S N N E E N E N E b E	S 31, 31 W	157.4	47°, 46′	2°, 5′ W	At noon the Lizard bore N 31°, 31′ E diſt. 157.4 Miles.	Fair weather at four P. M. I took my departure from the Lizard, bearing N N E, diſtance five leagues.
♂			Weſt N W b W S W b W	S 34, 10 E	48, 2	47°, 06′	1°, 35′ W	At noon the Lizard bore S 17°, 55′ W diſt. 183 Miles	Strong gales of wind and variable.

JOURNAL

JOURNAL is alſo a name common for weekly eſſays, news-papers, *&c.* as the Gray's Inn Journal, the Weſtminſter Journal, *&c.*

JOURNEYMAN, properly one who works by the day only; but it is now uſed for any one who works under a maſter, either by the day, the year, or the piece.

JOURNEYS-ACCOUNTS, in law, ſignifies as ſoon as poſſible: thus, when a writ is rendered void by the death of the defendant, or for want of form, *&c.* the plaintiff becomes entitled to have a new writ by journeys-accounts, that is, within as little time as he poſſibly can, after the abatement of the firſt; in which caſe, the ſecond writ is a continuance of the cauſe, as much as if the firſt writ had never abated. This ſecond writ is to be brought within fifteen days at moſt, after the abatement of the firſt, which muſt have been without any fault of the plaintiff, otherwiſe a ſecond writ cannot be brought by journeys-accounts: yet if the abatement be by default of the clerk, in not writing the writ in due form, the plaintiff may have it. The ſecond writ muſt be brought for the ſame thing, and alſo in the ſame court as the firſt. This is to be obſerved, that judicial writs can never be had by journeys-accounts.

JOYNERY, or JOINERY. See JOINERY.

JOZO, in ichthyology, the gobius with the ventral-fins blue, and the rays of the back-fin aſſurgent. See GOBIUS.

This fiſh grows to ſix or eight inches in length, and to about an inch in diameter; the head is thick but ſomewhat compreſſed, the body rounded, the eyes large, and their iris of a ſilvery white.

IPECACUANHA, in the materia medica, a weſt-indian root, of which there are two kinds, diſtinguiſhed by their colour, and brought from different places, but both poſſeſſing the ſame virtues, though in a different degree. The one is grey, and brought from Peru; the other is brown, and is brought from the Brazils: and theſe are indifferently ſent into Europe under the general name of ipecacuanha.

Theſe two ſorts have been by ſome ſuppoſed to be the roots of two different plants, but this is a miſtake; the only difference is, that one grows in a different place, and in a richer and moiſter ſoil, and is better ſupplied with juices than the other.

The grey ipecacuanha ought to be choſen for medicinal juices, preferable to the brown, as the latter is apt to operate more roughly. The peruvian, or grey, ipecacuanha is a ſmall and irregularly contorted and twiſted root; it is of the thickneſs of a gooſe-quill, and riſes into a ſort of annular ridges, running quite round the root. It is conſiderably hard, and does not cut eaſily through with the knife; but on bending it much, it eaſily breaks. It is of a duſky greyiſh colour on the ſurface, and when broken appears of a clearer and paler grey, and diſcovers a tough and firm nerve, occupying its center, and running its whole length. The whole root is of a peculiar and ſomewhat pungent ſmell; in taſte it is acrid and ſomewhat bitteriſh, and upon the whole very diſagreeable.

The brown, or braſilian, ipecacuanha reſembles the other, but is more twiſted and convoluted; it is a ſmaller and ſhorter root, of a deep duſky brown on the outſide, and white when broken: it is leſs acrid and more bitter than the grey-kind.

The grey and brown are both of them ſo acrimonious, that the people employed to pound any quantity of either, if they have not the caution very carefully to avoid the duſt that ariſes from the mortar, are often ſeized immediately afterwards with a difficulty of breathing, and ſpitting of blood, and ſometimes with bleeding at the noſe, and a great ſwelling and inflammation of the face, eyes, and throat; theſe ſymptoms generally go off in a day or two of themſelves; but if they are more than ordinary violent, it may be proper to bleed for them.

Ipecacuanha, however, is an excellent, mild, and ſafe emetic; it is alſo a noble reſtringent; and given in doſes too ſmall to vomit, is the greateſt of all remedies for a dyſentery. Its doſe, as an emetic is from ſix or eight to thirty grains, and the beſt way of taking it is in white wine, in which it ſhould have firſt ſtood four and twenty hours. In dyſenteries the patient is firſt to take ſuch doſes of it as will vomit him, and afterwards to continue the uſe of it for a long time, at the rate of three or four grains, in any form, twice a day. Small doſes of ipecacuanha, are an excellent remedy in diarrhœas of a more ſimple kind; and in the fluor albus, we hardly know a better medicine.

IPECU, or the *Braſilian* WOOD PECKER, in ornithology, a ſpecies of picus, with a ſcarlet creſted head. See the articles PICUS and WOOD PECKER.

IPOMÆA, AMERICAN JASMINE, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla whereof confifts of a fingle infundibuliform petal; the tube is nearly cylindric, and very long; the limb is patent, and divided into five femi-lanceolated plane fegments; the fruit is a roundifh capfule, containing three cells; the feeds, of which there are feveral in each cell, are of an oval figure. This plant is by fome reckoned a fpecies of the convolvulus. See plate CXLIV. fig. 4.

IPSWICH, a borough and port-town of Suffolk, fituated on the river Orwel, twenty-four miles fouth-eaft of Bury.

It fends two members to parliament.

IRBIL, or ARBELA, a town fituated on the river Lycus, in a fine plain in the province of Affyria, now Curdeftan, eaft long. 44°, north lat. 35° 15′, where Alexander fought the third and laft decifive battle with Darius.

IRELAND, an ifland of the Atlantic ocean, fubject to Great Britain, fituated between 5° and 10° weft long. and between 51° and 56° north latitude; being bounded by the Northern ocean on the north, by St. George's channel, which divides it from Great Britain, on the eaft, and by the Atlantic and Weftern ocean on the fouth and weft. This country is two hundred and fifty miles long, and one hundred and fifty broad; diftant from Holyhead, in north Wales, fifty miles, and from Galloway, in Scotland, fifteen miles. It is divided into four large provinces, *viz.* Ulfter on the north, Leinfter on the eaft, Munfter on the fouth, and Connaught on the weft.

IRIS, the RAINBOW, in phyfiology. See the article RAINBOW.

IRIS, in anatomy, the anterior coloured part of the uvea of the eye. See EYE.

The iris is a circular varioufly coloured part, which furrounds the pupil; it is in fome perfons blue, in others black, brown, grey, &c. each of which has its peculiar beauty, and is fuited to the complexion of the perfon who has it.

IRIS, the FLOWER DE LUCE, in botany, a genus of the triandria-monogynia clafs of plants, under which is comprehended the xiphion, fifyrinchium, and hermodactylus of authors, the characters of which are thefe: the flower is monopetalous, but divided into fix long and obtufe fegments; the three exterior ones being reflex, or bent back, and the three inner ones erect and more acute; the fruit is an oblong, angular, and trilocular capfule, containing a great number of feeds. See plate CXLIV. fig. 5.

The florentine, or dry iris-root, is an attenuant and expectorant, and accordingly given with fuccefs in afthmas and diforders of the breaft and lungs; the dofe is from ten to fifteen grains in powder. The juice of the frefh root of our common iris is an excellent medicine in dropfies; and the beft way of giving it is in white wine, an ounce or two for a dofe: it works both by vomit and ftool, and carries off a very great quantity of phlegm. It is alfo ordered as a fternutatory, to be fnuffed up the nofe, in complaints of the head, which it eafes very much, by bringing away the over-abundant phlegm.

IRIS, or RAINBOW CRYSTAL, in the hiftory of foffils, is the whitifh ellipomacroftylum, with a very long pyramid. See ELLIPOMACROSTYLA.

IRON, *ferrum*, in natural hiftory, the lighteft of all metals excepting tin, but confiderably the hardeft of them all.

It is, when pure, naturally malleable and ductile under the hammer; but that in a lefs degree than either gold, filver, lead, or copper. When wrought into fteel, or when in the impure ftate from its firft fufion, in which it is called caft iron, it is fcarce malleable at all: the moft ductile iron in the world alfo, on being only heated and fuddenly quenched in cold water, lofes much of this quality.

Iron is extremely capable of ruft; more fo than any other metal; it is very fonorous; it requires the ftrongeft fire of all the metals to melt it; it muft be a very good furnace that will make iron run without the blaft of bellows; but it is found, when once heated to a proper degree, this blaft will effect that without the affiftance of the farther heat of any fuel being employed in it; for if an iron-bullet, made red-hot, be fufpended at a diftance from the fire, and the blaft of a ftrong pair of bellows forcibly directed againft it in that condition, it will in a little time melt and run down in drops, by the mere effect of the current of the air they convey to it. Iron is lefs fimple in its compofition than any of the heavier metals: it contains, indeed, a fulphur fo imperfectly blended with the reft of its conftituent matter, that it will readily get loofe from it, and in a ftrong heat will appear in vifible flames. It is the moft difficult of all the metals to be amalgamated with mercury; the metallurgic authors

thors in general, have faid that it will not amalgamate with it at all; but, from the fuccefs of fome late attempts towards making this union between them, it appears to be not impoffible, that a method may be found of doing it.

Iron is lefs fixed in the fire, than moft of the other metals; it manifeftly fumes and fparkles, when expofed to a moderately fierce degree of it; it lofes alfo a part of its weight in the heat, and much more when in fufion. Iron is remarkable for the effect fire has on it, in rendering it more ductile; moft of the other metals are brittle, while they are hot; but this is moft of all malleable, as it approaches neareft to fufion. It grows red-hot long before it melts, and is known to be approaching towards that ftate, by its becoming whiter, and by its fparkling: if taken from the fire, as foon as it runs, it is found to be more malleable for the fufion; but if it be kept long in that ftate, its fulphur diffipates in form of a white fmoke; the metal after this becomes much more brittle, and in fine runs into a bluifh glafs.

Iron, expofed to the focus of a great burning glafs, inftantly grows red-hot, then turns whitifh, fparkles and flames, and immediately after melts; foon after this the greateft part of it flies off in fparks, which appear very bright, and, if caught upon paper, are found to be fo many little globular bodies, all hollow like bomb-fhells: the remainder runs into a bluifh or purplifh glafs; and this glafs, expofed again to the fame focus, on a piece of charcoal, takes up, from the vegetable fuel, the fulphur or inflammable principle it had loft, and becomes true iron again. Upon the whole, the effects of a common, and thofe of a folar fire, on this body, concur to prove, that it confifts of vitriolic falt, a vitrifiable earth, and a peculiar bituminous matter, not found in any of the other metals. When perfectly pure, it readily melts with gold and filver, and unites with them in fufion; but if it be impure, it feparates itfelf, and forms a diftinct regulus above the furface of the other.

On being heated red-hot, it increafes in bulk and in weight; but it returns to its former gravity and dimenfions when cold.

Iron is foluble in all the ftronger acids; fpirit of nitre, or aqua fortis, fucceed moft readily in the folution of it; but, befide thefe, and all the other acids, it is to be diffolved alfo by a multitude of weaker menftruums, among the reft even by common water; for on lying long in this fluid, it communicates a manifeft tafte to it, and contracts a ruft, and throws off a yellow ochre. All falts, except the alkaline ones, readily diffolve iron; nay the very air has fo much power over it in this refpect, that the people who deal in utenfils made of it, are obliged to cover them with fome oily or fat fubftance, to make them retain their polifh. To this may be added, that iron is the moft eafily of all metals deftroyed by many other means: it neither refifts the force of lead nor of antimony; but, on being fufed with them, it almoft immediately vitrifies, and is carried off in form of fcoriæ.

The great teft of iron, is its anfwering to, or being attracted by, the magnet or loadftone; but then it muft be in its true metalline ftate, for many of its ores will not anfwer in any part to this trial. Experiments, however, prove, that iron may be produced by art, out of almoft every thing we know. Earths of almoft all kinds afford iron by calcination; and all the parts of animals and vegetables, as well their fluids as their folids, yield it by the fame means: if any plant, or part, or juice of a plant, be burnt to afhes, or the flefh, bones, blood, or fat of any animal, be treated in the fame manner, iron will be found in the afhes, and that in fo perfect a ftate, that it anfwers readily to the magnet. Honey, wax, and all other vegetable fubftances, collected by animals, contain iron, and it may feparated from them pure, in the fame manner: finally, our Dr. Lifter takes great pains to prove, that this metal is found in, nay, and is the bafis of the ftone in the bladder.

Iron in the bowels of the earth, when it enters the compofition of cryftals and fpars, feems to be two very different operations of the fame metal; they fometimes concur, as there are found purple rhombic cryftals of iron, and yellow cubic ones of lead; but in general it is much more frequent to be coloured hexangular fprigs, and colourlefs cubes and rhombs.

Among the gems, the amethyft, garnet, and hyacinth owe their colours to iron; and this metal has the fame effect in the preparation of the factitious gems, as in the natural ones; for, properly managed, it communicates a purple or red colour in various fhades and degrees, to glaffes

and

and to vitrified fubftances of all kinds. True native iron is not to be expected in the midft of maffes of its ore, but in detached fprigs or filaments in the fiffures of rocks, the whole fubftance of which is rich in that metal: fuch have been all the genuine fpecimens of this rich foffil, and fuch their place of formation.

The ores of iron generally difcover themfelves to be fuch, either by their refemblance to wrought iron in ftructure and look, or by the yellowifh or purplifh tinge they are coloured with. Thofe which have moft of all the appearance of the metal they contain, are ufually the richeft. There is an iron-ore found in Sweden and Germany, particularly in the Hartsforeft, which ufually lies in the largeft fiffures of the ftrata, in great lumps, and is very hard, heavy, and of a bluifh grey colour; this, when broken, has fo much of the fparkling appearance of the metal, that a perfon unaccuftomed to thefe fubjects, might eafily miftake it for real pure iron. This is the richeft iron-ore known, unlefs we except fome of the hæmatites. We have an ore very like this in the foreft of Dean, in Glocefterfhire, which is at this time worked to great advantage. Another kind we have in Derbyfhire, which is alfo common to Sweden and to Germany; it refembles the former, but that it is harder; and when broken, it is not fo bright and fparkling. There are alfo other very rich ores of a dufky brown colour, with a tinge of purple; of this kind are thofe worked at this time in Suffex, under the name of the cabala-vein. Another of the rich kinds, lefs common with us, is of a bluifh purple, with a few bright fpangles in it; but this is much inferior to the two former of thofe abovementioned.

The poorer ores of iron are generally of a more lax and friable texture, and of a yellowifh or reddifh hue, or elfe of a mixed colour between thefe, and with a caft of brownifh or blackifh in it: but the moft fingular of all the ores of iron is a white one, which appears only like a debafed cryftal, having not the leaft fign of metal in it. The common ochres, as well the yellow as the red, are alfo to be ranked among the number of the ores of iron; they are very rich in that metal, and are even worked for it in fome places to great advantage; nor are we to omit the mention of thofe elegant bodies which hang from the roofs of caverns in ironmines, in form of icicles; thefe are truly ftalactites of iron; they are generally produced in large clufters together, and called by the miners brufh-ore: thefe are almoft all iron. The cruftated ferrugineous bodies, common in our gravel-pits about London, are alfo very rich in iron, and have been worked for it in places where they are fufficiently plentiful. The red fubftance called fmit, is likewife a very rich iron-ore; this is much like the common Derbyfhire reddle, but finer and heavier.

Method of obtaining IRON *from its ore, in a clofe veffel.* Roaft for a few minutes in a teft under the muffel, and with a pretty ftrong fire, two centners of the fmall weight of your iron-ore grofly pulverifed, that the volatiles may be diffipated in part, and the ore itfelf be foftened, in cafe it fhould be too hard. When it is grown cold, beat it extremely fine, and roaft it a fecond time, as you do the copper-ore, but in a much ftronger fire, till it no longer emits any fmell; then let it grow cold again.

Compofe a flux of three parts of the white flux with one part of the fufible pulverifed glafs, or of the like fterile unfulphureous fcoriæ, and add glafs gall and coal-duft, of each one half part: add of this flux three times the quantity of your roafted ore, and mix the whole very well together: then choofe a very good crucible, well rubbed with lute within, to ftop the pores, which may be here and there unfeen; put into it your ore mixed with the flux, cover it over with common falt, and fhut it clofe with a tile, and with lute applied to the joints.

Put the wind-furnace upon its bottom part, having a bed made of coal-duft; introduce befide into the furnace, a fmall grate, fupported on its iron-bars, and a ftone upon it, on which the crucible may ftand as upon a fupport; furround the whole with hard coals, not very large, and light them at top; when the veffel begins to grow red, which is indicated by the common falt's ceafing to crackle, ftop with grofs lute, or windfor-loam, the holes of the bottom part, except that in which the nozzle of the bellows is received; blow the fire, and excite it with great force, adding now and then frefh fuel, that the veffel may never be naked at top. Having thus continued your fire in its full ftrength for three quarters of an hour, or a whole hour, take the veffel out of it, and ftrike the pavement on which it is fet, that the fmall grains of iron that

happen

happen to be dispersed, may be collected into a regulus, which you will find after having broken the vessel.

Preparations of IRON, in medicine, are,

1. The crude filings, reduced to an impalpable powder, greatly recommended in female disorders.

2. The crocus martis. See CROCUS.

3. The flores martiales, or flowers of iron. See the article FLOS.

4. The sal martis, or salt of iron, which is prepared thus: mix together a quart of water, and eight ounces of the oil of vitriol; pour the oil of vitriol in by a little at a time; put the mixed liquor into a glass-vessel, and add to it four ounces of the filings of iron: when the ebullition is over, evaporate the liquor to a pellicle, and set it to shoot, there will then be a green vitriol or salt found in fair crystals; dry them for use.

This salt is one of the most powerful preparations of this metal; it opens obstructions of all kinds, strengthens the viscera, is an excellent medicine in cachexies, and destroys worms.

5. Tincture of iron, with spirit of salt, is made thus: take filings of iron, half a pound; Glauber's spirit of sea-salt, three pounds; rectified spirit of wine, three pints: digest the spirit of salt and the filings together, without heat, as long as the spirit will work upon them; then after the fæces have subsided, pour off the clear liquor, evaporate it to one pound, and to this add the spirit of wine.

This has the same virtue as the crocus martis. See the article CROCUS.

6. Chalybeate, or steel wine, is made in the following manner: take filings of iron, four ounces; cinnamon and mace, of each half an ounce; of rhenish wine, two quarts; infuse them a month, without heat, often shaking the vessel, and then filter it off for use.

This wine is an excellent stomachic and aperient; a moderate glass may be drank once or twice a day, or it may be mixed in apozems of the aperient vegetables.

Duties upon IRON. Any spanish, spruce, and swedish iron imported in any other ship or vessel than such as is english built, and of which the master, and at least three-fourths of the mariners are english, pays on importation, 2l. 17s. 10$\frac{65}{100}$d. the ton, and draws back on exportation, 2 l. 14 s. 6$\frac{75}{100}$d. the same imported in english-built ships, and so navigated, to pay on importation, 2 l. 8 s. 6$\frac{15}{100}$d. the ton, and draw back on exportation, 2 l. 5 s. 2$\frac{25}{100}$d. Iron slit or hammered into rods, commonly known by the name of rod-iron, pays on importation, 8s. 6$\frac{45}{100}$d. the hundred wt. and draws back on exportation, 8 s. $\frac{75}{100}$d. Ditto from Ireland, pays 3 s. 10$\frac{20}{100}$d. and draws back, 3 s. 4$\frac{50}{100}$d. Iron drawn or hammered, less than three fourths of an inch square, pays on importation, 8 s. 6$\frac{45}{100}$d. the hundred weight, and draws back on exportation, 8 s. $\frac{75}{100}$d. Unwrought iron of Ireland, pays on importation, 1l. 6s. 11 $\frac{40}{100}$d. the ton, and draws back on exportation, 1 l. 3 s. 7$\frac{50}{100}$d. Unwrought iron of all other places, not otherwise rated, imported in british ships, pays on importation, 2 l. 8 s. 6$\frac{15}{100}$d. the ton, and draws back on exportation, 2 l. 5 s. 2$\frac{25}{100}$d. and in foreign ships, pays on importation, 2 l. 17 s. 10$\frac{65}{100}$d. and draws back on exportation, 2 l. 14 s. 6$\frac{75}{100}$d. Iron-wares manufactured, not otherwise rated, or not prohibited by law, pay per hundred weight on importation, 12 s. 4$\frac{65}{100}$d. and draw back on exportation, 11 s. 5$\frac{25}{100}$d. Iron-ore the ton, pays on importation, 2 s. 4$\frac{72\frac{1}{2}}{100}$d. and draws back on exportation, 2 s. 1$\frac{87\frac{1}{2}}{100}$d. Old bushels, broken and cast iron, pays on importation, the ton, 11 s. 11$\frac{62\frac{1}{2}}{100}$d. and draws back on exportation, 10 s. 9$\frac{37\frac{1}{2}}{100}$d. Backs for chimnies, small, the piece, pay on importation, 2s. 4$\frac{52\frac{1}{2}}{100}$d. and draw back on exportation, 2 s. 2$\frac{62\frac{1}{2}}{100}$d. Backs for chimnies, large, the piece, pay on importation, 4 s. 9$\frac{50}{100}$d. and draw back on exportation, 4s. 5$\frac{25}{100}$d. Bands for kettles, the hundred wt. pay on importation, 12s. 4$\frac{65}{100}$d. and draw back on exportation, 11 s. 5$\frac{25}{100}$d. Fire irons, the groce, pay on importation, 1 s. 11$\frac{10}{100}$d. and draw back on exportation, 1 s. 8$\frac{25}{100}$d. More for every hundred weight on importation, 4 s. 8$\frac{25}{100}$d. and draw back on exportation, 4 s. 8$\frac{25}{100}$d. Hoops the hundred wt. pay on importation, 9 s. 9$\frac{85}{100}$d. and draw back on exportation, 9 s. 2$\frac{25}{100}$d. Stoves, the piece, pay on importation, 19 s. 3 d. and draw back on exportation, 16 s. 10$\frac{50}{100}$d. More for every hundred weight on importation,

4 s.

4 s. $8\frac{25}{100}$d. and draw back the ſame.

Iron kettles, the piece, pay 1 s. $2\frac{6\frac{1}{4}}{100}$d. and draw back, on exportation, the ſame; and beſides for every hundred weight on importation, 7 s. $8\frac{40}{100}$d. and draw back on exportation, 6 s. 9 d.

Pig or bar-iron, from the britiſh plantations in America, is imported free; but all ſuch iron muſt be ſtamped with a mark, denoting the colony, or place where it was made, and a certificate produced of the oath of the exporter, ſigned by two of the principal officers of ſuch colony; and the maſter, or commanding officer of the ſhip, or veſſel, importing ſuch iron, muſt make oath, that the iron ſo imported, is the ſame as that mentioned in the certificate.

Mill for IRON WORK. See SMITHERY.

IRON-SICK, in the ſea-language, is ſaid of a ſhip or boat, when her bolts or nails are ſo eaten with ruſt, and ſo worn away, that they occaſion hollows in the planks, whereby the veſſel is rendered leaky.

IRON-WORT, *ſideritis*, in botany. See the article SIDERITIS.

IRONY, in rhetoric, is when a perſon ſpeaks contrary to his thoughts, in order to add force to his diſcourſe; whence, Quintilian calls it diverſilioquium.

Thus, when a notorious villain is ſcornfully complemented with the titles of a very honeſt and excellent perſon; the character of the perſon commended, the air of contempt that appears in the ſpeaker, and the exorbitancy of the commendations, ſufficiently diſcover the diſſimulation or irony.

Ironical exhortation is a very agreeable kind of trope; which, after having ſet the inconveniences of a thing in the cleareſt light, concludes with a feigned encouragement to purſue it. Such is that of Horace, when, having beautifully deſcribed the noiſe and tumults of Rome, he adds ironically,

Go now, and ſtudy tuneful verſe at Rome!

IROQUOIS, the name of five nations in North America, in alliance with the britiſh colonies. They are bounded by Canada on the north, by the britiſh plantations of New-York and Penſylvania on the eaſt and ſouth, and by the lake Ontario on the weſt.

IRRADIATION, the act of emitting ſubtile effluvia, like the rays of the ſun, every way. See EFFLUVIUM.

IRRATIONAL, an appellation given to ſurd numbers and quantities. See the articles NUMBER, QUANTITY, and SURD.

IRREDUCIBLE *Caſe*, in algebra, is uſed for that caſe of cubic equations where the root, according to Cardan's rule, appears under an impoſſible or imaginary form, and yet is real. Thus in the equation, $x^3 - 90x - 100 = 0$, the root, according to Cardan's rule, will be $x = \sqrt[3]{50 + \sqrt{-24500}} + \sqrt[3]{50 - \sqrt{-24500}}$, which is an impoſſible expreſſion, and yet one root is equal to 10; and the other two roots of the equation are alſo real. Algebraiſts, for two centuries, have in vain endeavoured to reſolve this caſe, and bring it under a real form; and the queſtion is not leſs famous among them, than the ſquaring of the circle is among geometers. See the article EQUATION.

It is to be obſerved, that as in ſome other caſes of cubic equations, the value of the root, though rational, is found under an irrational or ſurd-form; becauſe the root in this caſe is compounded of two equal ſurds with contrary ſigns, which deſtroy each other; as if $x = 5 + \sqrt{5} + 5 - \sqrt{5}$; then $x = 10$; in like manner, in the *irreducible* caſe, when the root is rational, there are two equal imaginary quantities, with contrary ſigns, joined to real quantities; ſo that the imaginary quantities deſtroy each other. Thus the expreſſion:

$\sqrt[3]{50 + \sqrt{-24500}} = 5 + \sqrt{-5}$; and $\sqrt[3]{50 - \sqrt{-24500}} = 5 - \sqrt{-5}$. But $5 + \sqrt{-5} + 5 - \sqrt{-5} = 10 = x$, the root of the propoſed equation.

Dr. Wallis ſeems to have intended to ſhew, that there is no caſe of cubic equations irreducible, or impracticable, as he calls it, notwithſtanding the common opinion to the contrary.

Thus in the equation $r^3 - 63r = 162$, where the value of the root, according to Cardan's rule, is, $r = \sqrt[3]{81 + \sqrt{-2700}} + \sqrt[3]{81 - \sqrt{-2700}}$, the doctor ſays, that the cubic root of $81 + \sqrt{-2700}$, may be extracted by another impoſſible binomial, *viz.* by $\frac{9}{2} + \frac{1}{2}\sqrt{-}$; and in the ſame manner, that the cubic root of $81 - \sqrt{-2700}$ may be extracted, and is equal to $\frac{9}{2} - \frac{1}{2}\sqrt{-3}$; from whence he infers,

infers, that $\frac{9}{2}+\frac{1}{2}\surd-3+\frac{9}{2}-\frac{1}{2}\surd-3=9$, is one of the roots of the equation proposed. And this is true: but those who will consult his algebra, p. 190, 191, will find that the rule he gives is nothing but a trial, both in determining that part of the root which is without a radical sign, and that part which is within: and if the original equation had been such as to have its roots irrational, his trial would never have succeeded. Besides, it is certain, that the extracting the cube root of $81+\surd-2700$, is of the same degree of difficulty, as the extracting the root of the original equation $r^3-63r=162$; and that both require the trisection of an angle for a perfect solution. See M. de Moivre in the appendix to Saunderson's algebra, p. 744. seq.

For Cardan's rule, see *Solution of cubic* EQUATION.

IRREDUCTIBLE *Case*, in algebra. See the article IRREDUCIBLE.

IRREGULAR, something that deviates from the common forms, or rules; thus we say an irregular fortification, an irregular building, an irregular figure, *&c.* See the article FORTIFICATION, *&c.*

IRREGULAR, in grammar, such inflections of words as vary from the original rules; thus we say, irregular nouns, irregular verbs, *&c.*

The distinction of irregular nouns, according to Mr. Ruddiman, is into three kinds, *viz.* variable, defective, and abundant; and that of irregular verbs into anomalous, defective and abundant. See ABUNDANT, DEFECTIVE, *&c.*

IRREGULAR, among casuists, is applied to a person who is unqualified for entering into orders; as being base-born, notoriously defamed, *&c.* and by that means rendered incapable of holding a benefice, or discharging any of the sacred functions.

IRREGULAR BODIES, are solids not terminated by equal and similar surfaces.

IRREGULAR COLUMN, in architecture, a column which does not only deviate from the proportions of any of the five orders, but whose ornaments, whether in the shaft or capital, are absurd and ill chosen.

IRREPLEVIABLE, or IRREPLEVISABLE, in law, signifies any thing that neither may nor ought to be replevied. It is said, that it is against the nature of a distress for rent, to be irreplevïable.

IRTIS, a great river, which runs from north to south through Russia, falls into the river Oby, and makes part of the boundary between Asia and Europe.

IRWIN, a port-town of Scotland, in the bailiwic of Cunningham, situated at the mouth of the river Irwin, on the Frith of Clyde: west longitude 4° 40′, north latitude 55° 35′.

ISABELLA, a fortress of the Austrian Netherlands, situated on the west side of the river Scheld, opposite to Antwerp, in east longitude 4° 10°, north latitude 51° 15′.

ISAIAH, or *Prophecy of* ISAIAH, a canonical book of the Old Testament. Isaiah is the first of the four greater prophets, the other three being Jeremiah, Ezekiel, and Daniel. This prophet was of royal blood, his father Amos being brother to Azariah, king of Judah. The five first chapters of this prophecy relate to the reign of Uzziah; the vision, in the sixth chapter, happened in the time of Jotham: the next chapters to the fifteenth, include his prophecies under the reign of Ahaz; and those that were made under the reigns of Hezekiah and Manasseh, are related in the next chapters to the end. The stile of this prophet is noble, sublime and florid. Grotius calls him the Demosthenes of the Hebrews. He had the advantage, above the other prophets, of improving his diction by conversing with men of the greatest parts and elocution, and this added a sublimity, force, and majesty to what he said. He impartially reproved the vices of the age in which he lived, and openly displayed the judgments of God that were hanging over the jewish nation; at the same time denouncing vengeance on the Assyrians, Egyptians, Ethiopians, Moabites, Edomites, Syrians, and Arabians, who were instrumental in inflicting those judgments. He foretold the deliverance of the Jews from their captivity in Babylon, by the hands of Cyrus king of Persia, an hundred years before it came to pass; but the most remarkable of his predictions are those concerning the Messiah, in which he not only foretold his coming in the flesh, but all the great and memorable circumstances of his life and death.

ISAMBLUCES, in natural history, the name of a genus of fossils, of the class of the selenitæ; but of the columnar, not the rhomboidal, kind. See the article SELENITÆ.

This word expreſſes a body in form of an obtuſe or blunt column, the ſides of which are all equal to one another. This diſtinguiſhes it from the genus of the iſchnambluces, or thin columnar ſelenitæ, two of the ſides of which being broader than the others, make it of a flatted form. The ſelenitæ of this genus conſiſt of ſix ſides, and two obtuſe or abrupt ends; and all their ſides being very nearly of the ſame breadth, they much reſemble broken pieces of the columns of ſprig chryſtal. See CRYSTAL, and ISCHNAMBLUCES.

The bodies of this genus, as well as the reſt of the columnar ſelenitæ, are ſubject to a longitudinal crack, which ſometimes admitting a ſmall quantity of clay, ſhapes it into the figure of an ear of graſs. Of this genus there are only two known ſpecies; 1. A whittiſh one, very much reſembling a broken ſprig of cryſtal, found among the white tobacco-pipe clay, near Northampton. And, 2. A ſhort and pellucid one, with ſlender filaments: this is found in the ſtrata of yellow clay in Yorkſhire, and ſometimes lying on the ſurface of the earth.

ISATIS, WOAD, in botany, a genus of the tetradynamia-ſiliquoſa claſs of plants, the corolla whereof conſiſts of four cruciform, oblong, obtuſe, patent petals, turning gradually ſmaller towards the ungues: the fruit is an oblong, lanceolato-obtuſe, compreſſed, ſmall pod, containing two valves, and conſiſting only of one cell: the ſeed is ſingle, ovated, and contained in the center of the fruit.

This plant is much uſed by dyers, as alſo in medicine, as an aſtringent, a vulnerary, and for ſtopping the menſes.

ISCHÆMUM, SCHOENANTH, in botany, a genus of plants, thus characterized by Scheukzer: the male and female flowers are ſeparate, but ſtand near each other; the male is a ſmall bivalve glume, placed on the calyx of the female flower, which is a biflorous glume: the ſeed is ſingle, and involved in the calyxes and corollulæ.

The whole plant is of a flagrant aromatic ſmell, and is accounted cephalic, but little uſed at preſent.

ISCHIA, an iſland in the Neapolitan Sea, ſituated fifteen miles weſt of the city of Naples, in 14° 40′, eaſt longitude, and 41° north latitude.

ISCHIADIC, in anatomy, a name given to two crural veins, called the greater and leſſer iſchias. See VEIN.

It ſignifies alſo a diſeaſe or pain of the hip; being a ſpecies of arthritis, ſeated in the joint of the hip, and commonly called ſciatica. See the article SCIATICA.

ISCHIAS, one of the iſchiatic veins. See VEIN, and the preceding article.

ISCHIUM, in anatomy, the name of a bone deſcribed under the article innominata oſſa. See INNOMINATA.

ISCHNAMBLUCES, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ; but one of thoſe which are of a columnar form, not of the common rhomboidal one. See the article SELENITÆ.

This word expreſſes a body in form of a thin or flatted column, with obtuſe ends. The characters of this genus are, that the bodies of it are of a flatted columnar form, and octohedral in figure, conſiſting of ſix long planes, and about two abrupt or broken ends: the whole being of a flatted figure. The top and bottom planes are much broader than the reſt; the four other planes, called the ſides, are narrower than theſe, but are uſually of very nearly the ſame breadth with one another, as are alſo theſe tops and bottoms, ſo that the whole figure comes very near an hexhedral priſm. The bodies of this genus very frequently have a long crack reaching their whole length; and clay often getting into this, ſpreads itſelf into the form of an ear of ſome of the graſſes, and has been miſtaken for a real ear of graſs. Of this genus there are only four known ſpecies. 1. A flat, broad, and pellucid kind, found in Northamptonſhire, Leiceſterſhire, and Yorkſhire, at conſiderably great depths in blue clay. 2. A dull rough-ſurfaced and thicker kind, found in many parts of Kent, and in great plenty in the cliffs of Sheppey-iſland. 3. A dull longitudinally ſtriated kind, found in the clay pits of Yorkſhire and elſewhere, and frequently marked in the middle with the figure of an ear of graſs. And 4. A thick, rough, and ſcaly kind, frequent on the ſhores of Sheppey iſland, and both in the clay pits and on the ſhores of Yorkſhire. This alſo has frequently the repreſentation of an ear of graſs.

ISCHURY, ἰσχυρία, in medicine, a diſeaſe conſiſting in an entire ſuppreſſion of urine. As the cauſes of an iſchury are various, they ought, according to Heiſter, to be carefully diſtinguiſhed from each other. When it proceeds from an inflammation of the kidneys, the pain and heat are principally in that region attended

attended with a fever; if from a ftone in the kidneys, it is accompanied with vomiting; if from a ftone in the bladder there is a violent pain in the bladder, which is extended to the very extremity of the urethra; a mucus, or pus, is excreted with pale urine; and upon proper examinations the ftone may be felt: but the moft certain fign, is fearching the bladder with a catheter. When this diforder arifes from a ftone in the urethra, it may be eafily felt. If from an inflammation of the neck of the bladder, there is a tumour and pain in the perinæum, as often as the place is touched; but it may be beft perceived by thrufting the finger into the anus, and turning it up towards the bladder, for a tumour will be perceived by the phyfician, and by the patient a burning and preffing pain; and when a catheter is introduced into the urethra, an impediment will be felt near the neck of the bladder, which will hinder it from proceeding farther. See the article CATHETER.

When the urinous paffages are obftructed by folid bodies, that is, the pelvis of the kidneys, the ureters or neck of the bladder, or the urethra, from a ftone contained therein; if it be fmall, thofe diuretics will be proper which are mentioned in a fit of the gravel or ftone, to which may be added a decoction of eryngo-root and epfom-falt, or felters-waters, taken often therewith. But if the ftone is large and cannot be excreted by this means, ftrong diuretics are highly hurtful; and it muft be cured by fection. See the article LITHOTOMY.

If the urine is fuppreffed from an inflammation of the kidneys or bladder, recourfe muft be had to the treatment and medicines prefcribed for the diforders under the article INFLAMMATION.

When the fpungy fubftance of the urethra is fwelled with blood, and as it were inflated, a copious bleeding is the principal remedy. See GONORRHOEA.

When a fpafm affects the neck of the bladder, it muft be treated with antifpafmodic powders, diuretic waters, and infufions with emulfions and lenient oils now and then, fuch as falad oil, oil of fweet almonds, poppy or linfeed; externally, cataplafms, ointments, clyfters, and baths of the emollient and demulcent kind, with gentle opiates. See SPASM.

If the difeafe proceeds from the palfy, as fometimes happens in old perfons, wherein there is no pain, the belly and perinæum muft be treated with frictions and fomentations of ftrengthening, nervine and fpirituous remedies, with cataplafms of onions, and other ftimulators applied to the bladder, with clyfters of the fame fort of herbs. When the urine is very urgent, it muft be evacuated by a catheter, which muft be repeated as often as occafion requires. See PALSY.

If the diforder proceeds from blood remaining in the bladder, or its neck, the concretion is to be refolved and expelled with warm infufions of digeftive herbs drank like tea; fuch as ground-ivy, arnica, chervil, with tincture of tartar, liquor of the terra foliata of tartar, with digeftive powders of crabs-eyes, faturated with the juice of oranges or lemons, fperma ceti, &c. but if all thefe fail, the catheter is to be introduced into the neck of the bladder, to break the concretion, and evacuate the urine. See the article RESOLVENTS, &c.

When there is an ulcer in the bladder, infufions of vulnerary abforbent roots and herbs muft be given, with mucilages and foft balfamics, efpecially balfam of Mecca, with a moderate ufe of quick-filver, efpecially if the cafe is venereal. See the article ULCER.

If there is a difficulty of urine in pregnant women, towards the laft months the beft remedy is to eafe the preffure on the part; but if that will not do, to ufe a catheter.

Laftly, if it proceeds from a fwelling of the proftrate glands, or it is become fcirrhous, it muft be treated as fuch; but if thefe remedies fail, the bladder muft be pierced with a trocar; and when the perforation is made, the water muft be evacuated as in the dropfy. This inftrument muft be left in the wound, and faftened in fuch a manner, that it does not fall out, fo that the urine may be made as often as there is occafion. It is a troublefome operation, but the only one left.

ISELASTICS, a kind of games, or combats, celebrated in Greece and Afia, in the time of the roman emperors.

The victor at thefe games had very confiderable privileges conferred on him, after the example of Auguftus and the Athenians, who did the like to conquerors at the olympic, pythian, and ifthmian games. They were crowned on the fpot immediately after their victory, had penfions allowed them, were furnifhed with provifions at the public

coſt, and were carried in triumph to their country.

ISENACH, a town of Germany in the circle of Upper Saxony, ſituated in eaſt long. 10° 12′, north lat. 51°.

ISENARTS, a town of Germany, in the circle of Auſtria, and dukedom of Stiria, ſituated thirty-five miles north weſt of Gratz.

ISERNIA, a town of Naples, in the province of Moliſe, ſituated in eaſt long. 15° 15′, north lat. 41° 36′.

ISIA, feaſts and ſacrifices antiently ſolemnized in honour of the goddeſs Iſis.

The Iſia were full of abominable impurities, and for that reaſon thoſe who were initiated were obliged to take an oath of ſecrecy: they held for nine days ſucceſſively, but were ſo abominable, that the ſenate aboliſhed them at Rome, under the conſulſhip of Piſo and Garbinius.

ISINGLASS, *ichthyocolla*, in the materia medica, &c. See ICHTHYOCOLLA.

ISINGLASS, in natural hiſtory, a name given to the white ſhining ſpecularis, with large and broad leaves; otherwiſe called muſcovy-glaſs. See the article SPECULARIS.

ISINGLASS-FISH, the ſame with the huſo. See the article HUSO.

ISIS, in botany, the name by which Linnæus calls the coral-plant. See CORAL.

ISLAND, a tract of dry land, encompaſſed with water, in which ſenſe it ſtands contradiſtinguiſhed from continent, or terra firma. See the article CONTINENT.

Several naturaliſts are of opinion, that the iſlands were formed at the deluge: others think, that there have been new iſlands formed by the caſting up of vaſt heaps of clay, mud, ſand, &c. others think they have been ſeparated from the continent by violent ſtorms, inundations, and earthquakes. Theſe laſt have obſerved, that the Eaſt-Indies, which abound in iſlands more than any other part of the world, are likewiſe more annoyed with earthquakes, tempeſts, lightnings, vulcanos, &c. than any other part. Others again conclude, that iſlands are as antient as the world, and that there were ſome at the beginning, and among other arguments, ſupport their opinion from Gen. x. 5. and other paſſages of ſcripture.

Varenius thinks, that there have been iſlands produced each of theſe ways. St. Helena, Aſcenſion, and other ſteep rocky iſlands, he ſuppoſes to have become ſo by the ſea's over-flowing their neighbouring champaigns: but by the heaping up huge quantities of ſand, and other terreſtrial matter, he thinks the iſlands of Zealand, Japan, &c. were formed. Sumatra and Ceylon, and moſt of the Eaſt-Indian iſlands, he thinks, were rent off from the main land; and concludes, that the iſlands of the Archipelago were formed in the ſame way, imagining it probable, that Ducalion's flood might contribute towards it. The antients had a notion that Delos, and ſome other few iſlands, roſe from the bottom of the ſea, which, how fabulous ſoever it may appear, agrees with later obſervations. Seneca takes notice, that the iſland Theraſia roſe thus out of the Ægean ſea in his time, of which the mariners were eye-witneſſes. They had alſo an opinion that there are ſome iſlands which ſwim in the ſea. Thales, indeed, thought that the whole earth which we inhabit floated in the ſea: but floating iſlands are not only probable, but well atteſted.

ISLAND or ICELAND, in geography, an iſland of Denmark, ſituated between 10 and 26 degrees weſt long. and between 64 and 67 north lat. being about 300 miles in length from eaſt to weſt; and 150 in breadth from north to ſouth.

ISLAND-*Cryſtal*, a body famous among the writers of optics, for its property of a double refraction; but very improperly called by that name, as it has none of the diſtinguiſhing characters of cryſtal, and is plainly a body of another claſs. Dr. Hill has reduced it to its proper claſs, and determined it to be of a genus of ſpars, which he has called, from their figure, parallelopipedia, and of which he has deſcribed ſeveral ſpecies, all of which, as well as ſome other bodies of a different genus, have the ſame properties. Bartholine, Huygens, and Sir Iſaac Newton, have deſcribed the body at large, but have accounted it either a cryſtal or a talc; errors which could not have happened, had the criterions of foſſils been at that time fixed; ſince Sir Iſaac Newton has recorded its property of making an ebullition with aqua fortis, which alone muſt prove that it is neither talc nor cryſtal, both thoſe bodies being wholly unaffected by that menſtruum. See the articles PARALLELOPIPEDIA, CRYSTAL and TALC.

It is always found in form of an oblique parallelopiped, with ſix ſides, and is found of various ſizes, from a quarter of an inch to three inches or more in diameter,

meter. It is pellucid, and not much lefs bright than the pureft cryftal, and its planes are all tolerably fmooth, though, when nicely viewed, they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very fingular in the ftructure of this body, is, that all the furfaces are placed in the fame manner, and confequently it will fplit off into thin plates, either horizontally or perpendicularly; but this is found on a microfcopic examination, to be owing to the regularity of figure, fmoothnefs of furface, and nice joining of the feveral fmall parallelopiped concretions, of which the whole is compofed; and to the fame caufe is probably owing its remarkable property in refraction. See REFRACTION.

It is very foft, and eafily fcratched with the point of a pin; it will not give fire on being ftruck againft fteel, and ferments and is perfectly diffolved in aqua fortis. It is found in Ifland, from whence it has its name; and in France, Germany, and many other places. In England fragments of other fpars are very often miftaken for it, many of them having in fome degree the fame property. See ANOMORHOMBOIDA.

ISLE, in general, denotes the fame with ifland, only frequently ufed in a diminutive fenfe.

ISLE DE DIEU, an ifland in the Bay of Bifcay, on the coaft of France, fituated fourteen miles weft of the coaft of Poitou.

ISLE *of France*, a province of that kingdom, in which the capital city of Paris is fituated, being bounded by Picardy on the north, by Champain on the eaft, by Orleans on the fouth, and by Normandy on the weft.

ISLES, in architecture, denote the fides or wings of a building. See BUILDING.

ISNARDIA, in botany, a genus of the tetrandria-monogynia clafs of plants; having no corolla: the fruit is formed of the fquare bafe of the cup: it has four cells, and in them a few feeds of an oblong figure.

ISNY, a free imperial city of Germany, in the circle of Swabia, fituated in eaft long. 10° north lat. 47° 36'.

ISOCHRONAL, ISOCHRONE, or ISOCHRONOUS, is applied to fuch vibrations of a pendulum, as are performed in the fame fpace of time, as all the vibrations or fwings of the fame pendulum are, whether the arches it defcribes be longer or fhorter: for when it defcribes a fhorter arch, it moves fo much the flower, and when a long one proportionably fafter.

ISOCHRONAL LINE, that in which a heavy body is fuppofed to defcend without any acceleration. See ACCELERATION.

Mr. Leibnitz, in the Acta Erud. Lipf. for Feb. 1689, fhews, that an heavy body with a degree of velocity acquired by the defcent from any height may defcend from the fame point by an infinite number of ifochronal curves, all which are of the fame fpecies, differing from one another only in the magnitude of their parameters; fuch are all the quadrato-cubical paroboloids, and confequently fimilar to one another. He fhews alfo there, how to find a line in which a heavy body defcending fhall recede uniformly from a given point, or approach uniformly to it.

ISOETES, in botany, a genus of the cryptogamia-filices clafs of plants; the calyx of which is a cordated, acute, feffile fquama: there is no corolla in either the male or female flowers; the fruit it an oval bilocular capfule; the feeds are numerous and globofe.

ISOLA, a port town and bifhop's fee of the hither Calabria, fifteen miles fouth of St. Severino.

ISOMERIA, a term fometimes ufed for the reduction of equations. See the article EQUATION.

ISOPERIMETRICAL FIGURES, in geometry, are fuch as have equal perimeters, or circumferences. See the article CIRCUMFERENCE.

1. Of ifoperimetrical figures, that is the greateft that contains the greateft number of fides, or the moft angles, and confequently a circle is the greateft of all figures that have the fame ambit as it has. See the article CIRCLE.

2. Of two ifoperimetrical triangles, having the fame bafe, whereof two fides of one are equal, and of the other unequal, that is the greater whofe two fides are equal. See the article TRIANGLE.

3. Of ifoperimetrical figures, whofe fides are equal in number, that is the greateft which is equilateral and equiangular. From hence follows that common problem of making the hedging or walling that will wall in one acre, or even any determinate number of acres, a, fence or wall in any greater number of acres whatever b. In order to the folution of this problem, let the greater number b be fuppofed a fquare. Let x be one fide

of

of an oblong, whose area is a; then will $\frac{a}{x}$ be the other side; and $2\frac{a}{x} + 2x$ will be the ambit of the oblong, which must be equal to four times the square root of b; that is, $2\frac{a}{x} + 2x = 4\sqrt{b}$.

Whence the value of x may be easily had, and you may make infinite numbers of squares and oblongs that have the same ambit, and yet shall have different given areas. See the operation:

Let $\sqrt{b} = d$

Then $\frac{2a + 4xx}{x} = 4d$

$$a + 2xx = 2dx$$

$$2xx - 2dx = -a$$

$$xx - dx = -\frac{a}{2}$$

$$xx - dx + \tfrac{1}{4}dd = -\frac{a}{2} + \tfrac{1}{4}dd$$

$$x = \sqrt{-\frac{a}{2} + \tfrac{1}{4}dd} + \tfrac{1}{2}d$$

Thus if one side of the square be 10; and one side of an oblong be 19, and the other 1: then will the ambits of that square and oblong be equal, *viz.* each 40, and yet the area of the square will be 100, and of the oblong but 19.

ISOPYRUM, in botany, a genus of the polyandria-digynia class of plants, the corolla of which consists of five equal, ovated and patent petals: the fruit is composed of two crooked, lunated pods, with only one cell in each, containing numerous seeds.

ISOSCELES-TRIANGLE, in geometry, one that has two equal sides, as A B C (pl. CXLVIII. fig. 2.) where the side A B is equal to A C.

In every isosceles-triangle, the angles A B C, A C B, subtended by the equal sides, are equal; and a line A D bissecting the base B C in D, is perpendicular to it, as is easily demonstrated. See the article TRIANGLE.

ISPAHAN, or SPAHAWN, the capital city of Eyrac Agem, and of all Persia: it is of an oval form, and twelve miles in circumference: east long. 50°, north lat. 32° 30′.

ISPIDA, the KING-FISHER, in ornithology, a genus of the picæ-order of birds, with a beak of a trigonal figure, somewhat arcuated, compressed, and its two chaps equal: there are four toes on each foot, with only one of them placed behind.

This is a very numerous genus, the species of which are chiefly distinguished by their size and different colours.

ISSUE, in law, has several significations, it being sometimes taken for the children begotten between a man and his wife; sometimes, for profits arising from amercements and fines; and sometimes, for the profits issuing out of lands or tenements: but this word generally signifies the conclusion, or point of matter, that issues from the allegations and pleas of the plaintiff and defendant in a cause tried by a jury of twelve men.

There are two kinds of issues in relation to causes, that upon a matter of fact, and that upon a matter of law: that of fact is where the plaintiff and defendant have fixed upon a point to be tried by a jury; and that in law is, where there is a demurrer to a declaration, &c. and a joinder in demurrer, which is determinable only by the judges. Issues of fact are either general or special: they are general, when it is left to the jury to find whether the defendant has done any such thing as the plaintiff has alledged against him; and special, where some special matter, or material point alledged by the defendant in his defence, is to be tried. General issue also signifies a plea in which the defendant is allowed to give the special matter in evidence, by way of excuse or justification; this is granted by several statutes, in order to prevent a prolixity in pleading, by allowing the defendant to give any thing in evidence, to prove that the plaintiff had no cause for his action.

In real actions, the issues are triable by a jury of the county in which the cause of action arises. Issues are to be certain and single, and joined upon the most material point in question, so that the whole matter in dispute between the parties may be tried. On a joint action of trespass by many persons, only one issue must be joined; and where several offences are charged against a defendant, he ought to take all but one by protestation, and then offer an issue on that one, and no more; though in an action for damages, every part, according to the loss the plaintiff has sustained, is to be put in issue. Where a good issue is joined between the parties, it cannot afterwards be waved, without the consent of both parties: but where the defendant pleads the general issue, and does not enter the same, he may within four days of term

wave

wave such issue, and plead specially: so if a defendant pleads in abatement, he may any time after wave his special plea, and plead the general issue, except a rule be made for him to plead as he will stand by it: but in case the plaintiff omits entering the issue the term it is joined, the defendant in the first five days of the next term, may alter his plea, and plead de novo: and when the plaintiff will not try the issue, after the same is joined, within the time required by the course of law, the defendant may give him a rule to enter it, and if he does not then try it he shall be nonsuited.

Issues *on sheriffs*, are such amercements and fines to the crown, as are levied out of the issues and profits of the lands of sheriffs, for their faults and neglects: but these issues, on shewing a good and sufficient cause, may be taken off before they are estreated into the exchequer.

Issues are also leviable upon jurors, for non-appearance; though upon a reasonable excuse, proved by two witnesses, the justices may discharge the same.

Issues, in surgery, are little ulcers made designedly by the surgeon in various parts of the body, and kept open by the patient, for the preservation or recovery of his health.

The parts in which issues are generally made, are either the upper part of the head; the neck; the arms, betwixt the biceps and deltoide muscle, and near the insertion of the last; in the thigh, especially within side, immediately above the knee, in a cavity easily felt by the fingers; and, lastly, in the legs, on their interior side, in a cavity immediately below the knee.

There are several methods of making issues, but the most ready one is by incision, which is performed thus: first mark the proper place with ink; then elevating the integuments between the thumb and fore-finger of the surgeon and an assistant on each side, you next proceed to make an incision thro' them, either with the scalpel or lancet, big enough to admit a pea, which being inserted and covered with a plaster and compress, nothing more than your roller is wanting to compleat the operation. Thus by cleaning and dressing the wound every morning and evening with a fresh pea, it by degrees, in a day or two, degenerates into a little ulcer, discharging daily a quantity of purulent matter, which should be carefully cleansed or wiped off at every dressing.

There is a second method of making issues by wounding the skin with an actual cautery, or red hot iron, which is usually included in a sort of capsula, or case of iron (plate CXLIX. fig. 2.) to conceal it from terrifying the patient. When the case B B is fixed upon the proper part for the issue, the red-hot iron C, is then pressed down upon the integuments, and the eschar, or burn, is next to be dressed with fresh butter or basilicon, till by repeating the dressing every day, it separates, and then the ulcer formed, is to be filled with a pea, and dressed as before.

The third method of making issues is by the application of potential cauteries, or corroding medicines; in order to which a piece of plaster is first perforated, and then applied, so as its aperture may cover the place marked with ink for the issue: a piece of the caustic is then put into the aperture of the plaster, and retained close down upon the skin, with some scraped lint, a small compress, and a large plaster; and lastly, with a larger compress and bandage. The patient is then to be ordered to rest for about six or eight hours, more or less, according to the strength of the caustic, which time being elapsed, and the dressings removed, the eschar is to be treated as before directed in an actual cautery.

In whichever of these methods the issue is made, it must be dressed at least twice every day, especially if it runs well, and in the summer-season: and at each dressing you must put in a fresh pea, and cover it with a clean plaster, or a piece of waxed paper or silk, or an ivy-leaf retained with compress and bandage. But the deligation for issues is much more commodiously performed with a leathern swath, fastened by clasps, than by a circular linen-roller. In this manner issues are to be kept open, till the patient is recovered of the disorder for which they were made.

Issues are chiefly made for various disorders in the head, eyes, ears, teeth, the sciatica, and other painful disorders, which are this way frequently relieved or cured. But in stubborn disorders it is frequently necessary to make two or more issues to produce any considerable effect, as one in each arm, or in one arm and leg of the same side.

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In order to clofe an iffue, little more is required than to difcharge the pea, and to refrain from putting in any more, by which means alone it will clofe up in a fhort time: but if any proud flefh fhould arife, it may be amputated, or elfe removed with burnt alum. Laftly, it is obfervable, that when the iffues of people far advanced in years ceafe to make their wonted difcharge, and turn of a livid and blackifh hue, it is a fign that they are invaded by fome defperate diforder, and that life itfelf is very near its period.

ISTHMIA, or ISTHMIAN, GAMES, ισθμια, one of the four folemn games which were celebrated every fifth year in Greece; fo called from the corinthian ifthmus, where they were kept.

Thefe games, according to fome, were inftituted in honour of Palæmon, or Melicertes the fon of Athamas king of Thebes, and Ino. Others report, that they were inftituted by Thefeus, in honour of Neptune. Others again are of opinion, that there were two diftinct folemnities obferved in the Ifthmus, one to Melicertes, and another to Neptune. Thefe games were held fo facred and inviolable, that when they had been intermitted for fome time, through the oppreffion and tyranny of Cypfelus king of Corinth, after the tyrant's death the Corinthians, to renew the memory of them, employed their utmoft power and induftry. The victors were rewarded with garlands of pine leaves; afterwards, parfley was given them: but at length, the pine was refumed, and to this was added the reward of 100 filver drachmæ. Thefe games were fo celebrated, and the concourfe at them fo great, that only the principals of the moft remarkable cities, could have place in them. The Athenians had only as much room allowed them as the fail of a fhip, which they fent yearly to Delos, could cover.

ISTHMUS, in geography, a narrow neck of land, that joins two continents, or joins a peninfula to the terra firma, and feparates two feas. The moft celebrated ifthmufes are thofe of Panama, or Darien, which joins north and fouth America; and that of Suez, which connects Afia and Africa; that of Corinth, of Crim Tartary, &c.

ISTRIA, a peninfula in the north part of the gulph of Venice, bounded by Carniola, on the north; and on the fouth, eaft, and weft, by the fea.

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ITALIAN, the language fpoken in Italy. See the article LANGUAGE.

This tongue is derived principally from the latin; and of all the languages formed from the latin, there is none which carries with it more vifible marks of its original than the italian. It is accounted one of the moft perfect among the modern tongues, containing words and phrafes to reprefent all ideas, to exprefs all fentiments, to deliver ones felf on all fubjects, to name all the inftruments and parts of arts, &c. It is however, complained, that it has too many diminutives and fuperlatives, or rather augmentatives, but without any great reafon: for if thefe words convey nothing farther to the mind than the juft ideas of things, they are no more faulty than our pleonafms and hyperboles. The language correfponds to the genius of the people; they are flow and thoughtful, and accordingly their language runs heavily, though fmoothly, and many of their words are lengthened out to a great degree. They have a great tafte for mufic, and to gratify their paffion this way, have altered abundance of their primitive words, leaving out confonants, taking in vowels, foftening and lengthening out their terminations for the fake of the cadence. Hence the language is extremely mufical, and fucceeds better than any other in operas, and fome parts of poetry: but it fails in ftrength and nerves: hence alfo, a great part of its words borrowed from the latin, became fo far difguifed, that they are not eafily known again.

ITALIAN COINS. See COIN.

ITALIAN MEASURES. See MEASURE.

ITALIC CHARACTERS, in printing. See the article LETTER.

ITALIC, or ITALIAN HOURS, the twenty-four hours of the natural day, accounted from the fun fetting of one day, to the fame again the next day. See HOUR.

ITALIC SECT, the name of a fect of antient philofophers, founded by Pythagoras; fo called, becaufe that philofopher taught in Italy, fpreading his doctrine among the people of Tarentum, Metapontus, Heraclea, &c. This fect divided itfelf into four others, *viz.* the Heraclitic, Eleatic, &c.

ITALY, a country fituated between feven and nineteen degrees eaft long. and between thirty-eight and forty-feven degrees north latitude, bounded by Switzerland, and

and the Alps, which ſeparate it from Germany, on the north; by the gulph of Venice, on the eaſt; by the Mediterranean Sea, on the ſouth; and by the ſame ſea and the Alps, which ſeparate it from France, on the weſt; and if we include Savoy, which lies indeed on the weſt ſide of the Alps, between Italy and France, we muſt extend it a degree farther weſt: this is uſually deſcribed however with Italy, as it is contiguous to Piedmont, and has the ſame ſovereign, being a province of the king of Sardinia's dominions. Italy is ſaid to reſemble a boot, and is in length from north-weſt to ſouth-eaſt 600 miles; the breadth is very unequal; in the north, which may be called the top of the boot, it is 400 miles broad from eaſt to weſt, in the calf of the leg, or middle, it is about 120 miles broad; and towards the ſouth, about the inſtep, eighty miles broad; and comprehends the following countries or ſubdiviſions. 1. In the north are the duchies of Savoy, Piedmont, and Montſerrat; the territories of Genoa; the duchies of Milan, Mantua, Parma, Modena, and the territories of Venice. 2. In the middle of Italy, are the duchy of Tuſcany, the pope's dominions, and the ſtate of Lucca. 3. And in the ſouth is the kingdom of Naples.

ITCH, a cutaneous diſeaſe, ariſing from a corruption of a ſerous lymphatic matter, ſometimes attended with mild, ſometimes with more obſtinate and dangerous ſymptoms.

The itch of the milder ſort appears either with moiſt or dry puſtules at firſt about the joints, and from thence ſpreads by degrees over all the body, the head only excepted. In the moiſt ſort, to which children and the ſanguineo-phlegmatic are moſt ſubject, the puſtules are more full of a purulent matter, attended with a ſlight inflammation, which is manifeſt from a redneſs that appears about them, till it ſuppurates. The dry ſort attacks chiefly thoſe that are lean, old, or are of a melancholico-choleric conſtitution. In theſe the puſtules are much leſs, and excite a moſt intolerable itching, eſpecially in the night-time. The moſt uſual places where the eruptions appear very numerous, and the itching is greateſt, are between the fingers, on the arms, hams, and thighs.

This diſeaſe is truly and properly a diſeaſe of the ſkin, becauſe it often is ſafely cured by topics alone, if timely applied. It is contagious, and may be caught by drawing on a glove or ſtocking, wiping on the linen, or lying in ſheets, after perſons infected with this malady. Some think it owing to an impurity in the ſerum, and ſome to animalcula; but however that be, it often affects ſuch as have been long kept in priſon, who lead unactive lives, and are uſed to live in a fluttiſh, naſty manner; or who conſtantly eat fiſh or fleſh dried in the ſmoke or ſun, and uſe any other unwholeſome food or drinks; or who live in a cold, moiſt, and cloudy air, which, hindering a free perſpiration, cauſes a ſtagnation of humours in the ſuperficies of the body, which are for that reaſon liable to corrupt.

The milder ſort of itch is no way dangerous, and very eaſy to cure: but the moiſt kind is more eaſy than the dry. While it is recent and ſuperficial, it much ſooner yields to remedies than when it is deep, and has infected the maſs of blood. And the caſe is ſtill worſe, if there be a fault in the viſcera: it is more difficult in old perſons, than in young; in a leucophlegmatic, or hydropical diſpoſition, as alſo in a very dry hectic one, it is hard to cure; and when it becomes univerſal, it may bring on the leproſy.

The patient ſhould avoid ſhell-fiſh, and all ſalted and high-ſeaſoned meats; as alſo wine, ſpirituous liquors, ſtrong-beer, and every thing elſe that may inflame the blood: for this reaſon a ſlender diet is beſt, unleſs perſpiration be obſtructed. If the body is plethoric, the cure is begun by bleeding, and afterwards by purging; but inſtead of purging, it is common to give flowers of ſulphur with good ſucceſs. Willis, and many others, have a great opinion of the efficacy of ſulphur uſed both internally and externally; to which Turner aſſents, except in hectic and conſumptive caſes; but Shaw thinks it not to be depended on, when outwardly uſed: yet it is very certain, that poor people find a great deal of benefit who drink it inwardly with milk, and uſe it outwardly with butter or hog's lard.

Juncker, from Stahl, calls the following things ſpecifics againſt the acrimony of the itch, taken internally, *viz.* ſulphur with nitre and arcanum duplicatum, balſam of ſulphur with oil of ſweet almonds, tincture of ſulphur, and crude antimony. Outwardly he adviſes mercurial ointments, and ſulphureous lixiviums; but in the

the dry itch, he thinks baths more proper made of the root of burdock, the ſharp-pointed dock, and mineral fountain-water. Turner prefers the ſal. tart. to moſt other remedies, it thoroughly purging and cleanſing the blood if taken inwardly; and made into a lixivium with ſpring-water, is an excellent waſh outwardly.

Hartman, in an obſtinate itch, propoſes a diaphoretic of the white flowers of antimony to be taken twenty days together. When the blood is thought to be foul, it will be proper to uſe diet-drinks of the roots of china, ſarſaparilla, oxylapathum, ſcorzonera, chichory, glycyrrhiza, polypodium, the barks of ſaſſafras, cinnamon, and the like.

The moſt ſtubborn itch will generally yield to the following ointment, if proper evacuations have been premiſed. Take of quickſilver, three drams; native cinnabar, one dram; venice turpentine, half a dram; hog's lard, half an ounce; oil of ſweet almonds, two drams. Mix and divide this into eight equal parts, one of which is to be rubbed into the legs and arms every other night, or at greater intervals, if there are any ſigns of ſalivation: great care muſt be taken that the patient gets no cold, while he uſes this medicine; if he feels any griping pains, or if his breath begins to ſtink, the uſe of it is immediately to be ſuſpended. It has been a very common practice to cure the itch by quickſilver girdles, but Turner thinks them too hazardous to be brought into regular practice. See the article GIRDLE.

If this diſeaſe ſhould prove ſo ſtubborn as not to give way to the moſt powerful of the preceding methods, recourſe muſt be had to ſalivation as the dernier reſort. See the article SALIVATION.

But notwithſtanding theſe opinions, Dr. Mead affirms, that neither cathartics nor ſweetners of the blood are of any ſervice in this diſeaſe; that the whole management of it conſiſts in external applications for deſtroying the corroding worms, which he takes to be the true cauſe of the diſeaſe. For, he ſays, that there are certain inſects ſo very ſmall, as hardly to be ſeen without the aſſiſtance of a microſcope, which depoſite their eggs in the furrows of the cuticle, as in proper neſts, where by the warmth of the place, they are hatched in a ſhort time, and the young ones coming to full growth, penetrate into the cutis, and gnaw and tear the fibres, which cauſe an intolerable itching; that while they burrow under the cuticle, and lay their eggs in different places, they ſpread the diſeaſe. See the next article.

This was firſt diſcovered by Dr. Bonomo, and by him communicated to the celebrated Redi of Florence; and Dr. Mead having met with Bonomo's letter upon this ſubject in Italy, made an abſtract of it, and communicated it to the Royal Society. The doctor adviſes, that the patient ſhould firſt go into a warm bath, and then have the parts affected every day anointed with ointment of ſulphur, or the ointment with precipitate of mercury.

ITCH-ANIMAL, or ITCH-ACARUS, in the hiſtory of inſects, a very ſmall ſpecies of acarus, the body of which approaches to an oval and lobated figure; the head is ſmall and pointed; its colour is whitiſh, but it has two duſky, ſemicircular lines on the back; the legs are ſhort, and of a browniſh colour, and are harder than the reſt of the body, and as it were cruſtaceous. It is found in the puſtules of the itch, and is by many thought to cauſe that diſeaſe, though it is ſuppoſed if this were the caſe, it would be found more univerſally in thoſe puſtules. It is thought therefore more probable, that theſe puſtules only make a proper nidus for it. See the articles ACARUS and ITCH.

ITEA, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof is compoſed of five long, lanceolated, acute, patent petals; the fruit is an oval capſule, of many times the length of the cup, mucronated with the ſtyle, and formed of two valves, cohering at the points; the cell is ſingle, and the ſeeds numerous and ſmall.

ITINERANT JUDGES, a name formerly given to thoſe judges who were ſent into ſeveral counties to hear cauſes. See the article JUDGE.

JUBILEE, a time of public and ſolemn feſtivity among the antient Hebrews.

This was kept every fiftieth year: it began about the autumnal equinox, and was proclaimed by ſound of trumpet throughout all the country. At this time all ſlaves were releaſed, all debts annihilated, and all lands, houſes, wives and children, however alienated, were reſtored to their firſt owners. During this whole year all kind of agriculture was forbidden, and the poor had the benefit of the harveſt, vintage, and other productions of the earth, in the ſame manner

manner as in the ſabbatic, or ſeventh year. As this was deſigned to put the Iſraelites in mind of their egyptian ſervitude, and to prevent their impoſing the like upon their brethren, it was not obſerved by the gentile proſelytes.

The Chriſtians, in imitation of the Jews, have likewiſe eſtabliſhed jubilees, which began in the time of pope Boniface VIII. in the year 1300, and are now practiſed every twenty-five years; but theſe relate only to the pretended forgiveneſs of ſins, and the indulgences granted by the church of Rome: together with the privilege of performing a thouſand frolics in maſquerade. The ceremony of the jubilee obſerved at Rome, begins in the following manner: the pope goes to St. Peter's church, to open the holy gate, which is walled up, and opened only on this occaſion; and, holding a golden hammer in his hand, he knocks at the gate three times, repeating theſe words, *Aperite mihi portas juſtitiæ*, &c. *Open to me the gates of righteouſneſs; I will go into them, and I will praiſe the Lord*, Pſ. cxviii. 19. upon which the maſons fall to work, and break down the wall that ſtops up the gate: which done, the pope kneels down before it, and the penitentiaries ſprinkle him with holy water. Then, taking up the croſs, he begins to ſing te deum, and enters the church, followed by the clergy. In the mean time, three cardinal-legates are ſent to open the three other holy gates which are in the churches of St. John of Lateran, St. Paul, and St. Mary the Greater. When the holy year is expired, the holy gates are ſhut in this manner: the pope, after he has bleſſed the ſtones and mortar, lays the firſt ſtone, and leaves there twelve boxes of gold and ſilver medals; after which the holy gates are walled up as before, and continue ſo till the next jubilee.

JUCATAN, or YUCATAN, a peninſula of Mexico, ſituated between 89° and 94° weſt long. and between 16° and 21° north lat.

Its chief town is Campeachy. See the article CAMPEACHY.

JUDAICUS LAPIS, in the materia medica, the petrified ſpine of an echinus. See the article JEW'S STONE.

JUDAISM, the religious doctrines and rites of the Jews. See the article JEWS.

JUDDOCK, in ornithology, the engliſh name of a ſmall ſpecies of ſnipe, called alſo the ged or jack-ſnipe, and by authors gallinago minima.

JUDE, or *the general epiſtle of* JUDE, a canonical book of the New Teſtament, written againſt the heretics, who by their diſorderly lives and impious doctrines, corrupted the faith and good morals of the Chriſtians. St. Jude draws them in lively colours, as men given up to their paſſions, full of vanity, conducting themſelves by worldly wiſdom, and not by the ſpirit of God.

In the early ages of chriſtianity, ſeveral rejected this epiſtle becauſe the apocryphal books of Enoch and the aſcenſion of Moſes are quoted in it. Nevertheleſs, it is to be found in all the antient catalogues of the ſacred writings; and Clement of Alexandria, Tertullian and Origin, quote it as written by Jude, and reckon it among the books of ſacred ſcripture.

JUDEA, or PALESTINE. See PALESTINE.

JUDENBURG, a city of Stiria, in Germany: eaſt long. 15°, north lat. 47° 22'.

JUDGE, a chief magiſtrate of the law, appointed to hear criminal cauſes, to explain the laws, and to paſs ſentence according to the verdict brought in by the foreman of the jury. See JURY.

A judge, on his being created, takes an oath of office, that he will ſerve the king, and indifferently adminiſter juſtice to all men, without reſpect of perſons; that he will take no bribe; give no counſel, where he is a party; nor deny right to any, even though the king by his letters, or by expreſs words, command the contrary; and that he may have no temptation to break his oath, he enjoys his office and a ſettled ſalary for life, and it is not in the power of the crown to deprive him of either. He is to execute his office in perſon, and cannot act by a deputy, nor transfer his power to another: yet where there are ſeveral judges in a court of record, the act of any one of them is effectual, provided their commiſſion does not require more: ſo likewiſe what is carried by a majority preſent, is the act of the court: but where they are equally divided in opinion, the cauſe is to be removed into the exchequer-chamber, and for that purpoſe a rule is to be made, and the record certified, &c. Some things done by judges at their chambers, are accounted as done by the court: and that they may be prepared to hear what is to come before them, they are to have a paper of the cauſes to be heard, ſent to them by the attorneys the day before they are ſpoken

to; that if upon reading the record of a cause any special matter that arises should appear doubtful, they may satisfy themselves by consulting books.

To support their dignity and authority, the judges of the courts of record are exempted from all prosecutions whatsoever, except in parliament, where alone they may be punished for any thing they have done amiss in their own courts as judges: but yet if a judge should so far forget his dignity as to turn sollicitor in a cause which he is to judge, and extrajudicially tamper with witnesses, or attempt to work upon jurors, he may be dealt with in a manner suitable to the character to which he has so basely degraded himself. As the judge is the substitute of the king, and is designed to distribute that justice which he cannot administer in person, he cannot be challenged like a jury, nor have any action brought against him for what he acts as a judge: while he is on the bench his person is in a manner sacred, so that to kill a judge of any of the superior courts of Westminster, or of assize, on the place of administring justice, is treason; and drawing a weapon upon him in any of the courts of law, is to be punished with the loss of the right hand, the forfeiture of lands and goods, and perpetual imprisonment. On the other hand, a judge cannot sit as judge in his own cause: if he is guilty of taking a bribe, he is punishable by loss of office, fines and imprisonment; and if a judge, who has no jurisdiction, passes judgment of death, and his sentence is executed, both he, and the officer who executes it, is guilty of felony.

Itinerant JUDGES. See the article ITINERANT.

Book of JUDGES, a canonical book of the Old Testament, so called from its relating the state of the Israelites under the administration of many illustrious persons who were called judges, from their being both the civil and military governors of the people, and who were raised up by God upon special occasions, after the death of Joshua, till the time of their making a king. In the time of this peculiar polity, there were several remarkable occurrences, which are recorded in this book. It acquaints us with the gross impiety of a new generation which sprung up after the death of Joshua, and gives us a short view of the dispensations of heaven towards this people, sometimes relieving and delivering them, and at others, severely chastising them by the hands of their enemies.

The book of judges is usually divided into two parts: the one containing the history of the judges from Othniel to Sampson; which ends with the sixteenth chapter: the other containing several memorable actions, which were performed in or about the time of the judges, from the seventeenth chapter to the end of the book. The author of this book is wholly unknown; some ascribe it to Samuel, others to Hezekiah, and others to Ezra.

JUDGMENT, among logicians, a faculty or rather act of the human soul, whereby it compares its ideas, and perceives their agreement or disagreement. See the article KNOWLEDGE.

Not satisfied with the bare view and contemplation of its ideas, the mind assembles them together, and compares them one with another. In this complicated view of things, it readily discerns that some agree, and others disagree; and accordingly joins or separates them. Thus upon comparing the idea of two added to two, with the idea of four, we at first glance perceive their agreement, and pronounce them equal. Again, that white is not black, and that four and two do not make eight, are truths the mind as readily perceives.

This is the first and simplest act of the mind, in determining the relations of things; when by a bare attention to its own ideas, comparing any two of them together, it can at once see how far they are connected or disjoined. The knowledge thence derived is called intuitive, as requiring no pains or examination; and the act of the mind assembling its ideas together, and joining or disjoining them according to the result of its perception, is what logicians call judgment. See the articles IDEA, PERCEPTION, KNOWLEDGE, *&c.*

In common discourse, however, the term judgment is seldom confined to self-evident truths; but rather signifies those conjectures that we form, which do not admit of undoubted certainty, and where we are left to determine by comparing the various probabilities of things. Thus a man of sagacity, who seldom mistakes in the opinions he frames of characters and actions, is said to judge well, or think judiciously. Hence it might not be improper to change the common names of the two first operations of the mind, calling the one simple apprehension,

fion, and the other intuition. See the articles APPREHENSION and INTUITION.

JUDGMENT, in law, the fentence of the judges upon a fuit, *&c.*

Judgment may be given not only upon the trial of the iffue, but on a default, confeffion, demurrer, or an out-lawry, which is a judgment in itfelf. After iffue joined in a caufe, the plaintiff may, if he thinks proper, accept of a judgment from the defendant; but on fuch a judgment, a writ of error may be had without putting in bail, which cannot be done on a judgment after verdict. All judgments given in courts of record muft be entered; in order to which the plaintiff's attorney, four days after the record is brought into court, may, if the judgment is out, enter judgment by the ufual courfe of the court; but he cannot do this fooner, becaufe the defendant muft have time to bring in a writ of error, or to find out matter for an arreft of judgment. The defendant may oblige the plaintiff to enter his judgment, in order that he may plead it to any other action; and judgment upon a demurrer to a declaration, *&c.* which does not pafs upon the merits of the caufe, is no bar to it, though other judgments may be pleaded in bar to any action brought again for the fame thing. Judgments are to continue till they are reverfed: but an action of debt will lie on a good judgment, as well after a writ of error is brought, as before it. If a plaintiff does not take out an execution within a year and a day after judgment is obtained, the judgment muft be revived by a fcire facias. See the article SCIRE FACIAS.

JUDGMENTS *for crimes*, in cafe of treafon or felony, muft be by an exprefs fentence, an out-lawry or abjuration: and no judgment can be inflicted contrary to law, or that is not appointed by act of parliament. Thefe judgments are of very different kinds; as in high treafon the offender is fentenced to be drawn, hanged, his intrails taken out and burnt, his head cut off, and his body quartered, *&c.* In petit treafon the judgment is, to be drawn to the place of execution, and there hanged. But a woman in all cafes of high and petit treafon, is to be drawn and burnt. All perfons for felony, are to be hanged by the neck till dead. Judgment in mifprifion of treafon, is imprifonment for life: and for mifprifion of felony, the offender is fubject to a fine and imprifonment; and for crimes of an infamous nature, the judgments are difcretionary in the breaft of the court, and thofe guilty are punifhed by a fine, pillory, *&c.*

JUDGMENTS *for debts*, are acknowledged by a perfon's giving a general warrant of attorney to any attorney of the court in which it is to be acknowledged, to appear for him at the fuit of the party to whom the fame is to be done, and to file common bail, receive a declaration, and then to plead, *non fum informatus*, I am not informed; or to let it pafs by *nihil dicit*, he fays nothing; upon which judgment is entered for want of a plea. Judges that fign judgment of lands, are to fet down the day of the month and year in which they do it; and they fhall be good againft purchafers only from fuch figning. Where a perfon has acknowledged a judgment for the fecurity of money, and afterwards on borrowing more money of another perfon mortgages his lands, *&c.* without giving any notice of the judgment to the mortgagee; in fuch cafe, if the mortgager do not within fix months pay off and difcharge the judgment, he fhall forfeit his equity of redemption, 4 and 5 Will. and Mary. Acknowledging a judgment in the name of another perfon without his privity or confent, is made felony, by 21 Jac. I. c. 26.

JUDICIUM DEI, judgment of God, in law, a term applied to the trial by combat, by ordeal, *&c.*

JUDOIGNE, a town of the Auftrian Netherlands, in the province of Brabant, fituated on the river Gheet, thirteen miles fouth-eaft of Louvain, and fixteen north of Namur.

IVES, or St. IVES, a borough and port-town of Cornwal, fituated on the irifh channel: it fends two members to parliament: weft long. 6°, north lat. 50°18'.

JUGALE, in anatomy, the cheek-bone. See the article MALA.

JUGERUM, in roman antiquity, a fquare of 120 roman feet; its proportion to the Englifh acre being as 10000 to 16097. See the article MEASURE.

JUGLANS, the WALNUT-TREE, in botany, a genus of the monoecia-polyandria clafs of plants, the male corolla whereof being divided into fix parts, is elliptic, equal, and plane; the female one is divided into four fegments, acute, erect, and a little greater than the cup; the fruit is a large, dry, oval, unilocular berry, with a fulcated kernel.

This

This tree grows to a very confiderable height, and is very ramofe, and diffufe, from a third of its height upwards; the leaves are pinnated, and the pinnæ are obfcurely ferrated. We have it every where in our gardens. The kernel of the walnut is fimilar in quality to almonds; the fhell is aftringent, and as fuch is made ufe of by the dyers; but neither are employed in medicine. There is an oil expreffed from the walnut, which poffeffes the fame quality with that expreffed from linfeed and muftard, all agreeing in one common emollient virtue. It foftens and relaxes the folids, and obtunds acrimonious humours; and thus becomes ferviceable, internally, in pains, inflammations, heat of urine, hoarfenefs, coughs, &c. in glyfters, for lubricating the inteftines, and promoting the ejection of indurated fæces; and in external applications, for tenfions, and rigidity of particular parts. It is given inwardly, from half an ounce to three ounces, or more.

JUGULAR, in anatomy, an appellation given to two veins of the neck, which arife from the fubclavians. 1. The external jugular, diftributed over the external parts of the head; and which, in its feveral parts, receives different denominations from them, as the frontal, temporal, occipital, &c. vein. 2. The internal jugular, which gives ramifications to the larynx, the pharynx, the mufcles of the os hyoides, and to the tongue; thofe which are under its vertex being called raninæ. But befides thefe branches, its trunk terminates in a diverticulum, called the jugular fack, and brings back the blood from the finufes of the dura mater, and from the brain. See VEIN.

There are alfo certain glands in the anterior part of the neck, called jugular. See the article GLAND.

IVICA, or YVICA, the capital of an ifland of the fame name, fifty miles eaft of Valencia in Spain: eaft longitude 1°, north latitude 39°.

JUICE, denotes the fap of vegetables when expreffed. See the article SAP.

Under this head, Quincy tells us, we have nothing either in officinal or extemporaneous prefcription, unlefs the acacia and liquorice juice.

But befides thefe, there are other infpiffated juices, frequently ufed in medicine, as fcammony, aloes, gamboge, opium, catechu, elaterium, &c.

Juice of lemons, the pipe, pays on importation, 1 l. 10 s. $4\frac{80}{100}$d. and draws back on exportation, 1 l. 8 s. 6 d. Juice of limes, the gallon, pays, on importation, $2\frac{28}{100}$d. and on exportation draws back $2\frac{13\frac{3}{4}}{100}$d.

JUICE is alfo ufed to denote the liquors of animals, as the nervous juice, the pancreatic juice, &c.

JUJUBES, *jujubæ*, in the materia medica, the name of a fruit of the pulpy kind, produced on a tree called by authors ziziphus, which Linnæus makes a fpecies of rhamnus. See RHAMNUS.

This fruit is of an oblong figure, and fomewhat refembles a large olive in its fhape and fize: its ufual length is about an inch, and its thicknefs fomewhat more than half an inch. It is wrinkled on the furface deeply and irregularly, and when cut or broken, is found to confift of a thick pellicle, of a dufky yellowifh red colour, under which there lies a whitifh and foft pulpy, fungous matter, enclofing a ftone of an oblong figure. It has but little fmell, but is of a fweetifh and refinous tafte. It is to be chofen new, large, plump, and full of pulp, and of a fweet and pleafant tafte.

The jujubes have been made a general ingredient in pectoral decoctions; but they are now feldom ufed on thefe occafions, and are fcarce at all heard of in prefcription, or to be met with in our fhops.

JULEP, in pharmacy, a medicine compofed of fome proper liquor, and a fyrup or fugar of extemporaneous preparation, without decoction, defigned for the concoction or alteration of the humours, or reftoring the ftrength.

Difpenfatory writers mention feveral kinds of juleps. 1. The camphorated julep, thus prepared: take of camphire, one dram; of double refined fugar, half an ounce; of boiling water, a pint. Firft grind the camphire with a little rectified fpirit of wine, till it is foftened; then with the fugar, till they are perfectly united; laftly, add the water by degrees; and, when the mixture has ftood in a covered veffel, till it is cold, ftrain it off. 2. Chalk-julep, thus made: take of the whiteft chalk prepared, one ounce; of double refined fugar, fix drams; of gum arabic, two drams; of water, a quart. Mix all together. 3. The mufk-julep, thus prepared: take of damafk-rofewater, fix ounces; of mufk, twelve grains;

grains; of double refined fugar, one dram. Grind the mufk and fugar together, and gradually add the rofe-water. Befides thefe, there are feveral other preparations made up in the form of juleps, and denominated from their ufes, balfamic, cephalic, carminative, ftrengthening, &c. juleps.

JULIAN, or St. JULIAN, a harbour on the coaft of Patagonia, in South America, where fhips bound to the South feas ufually touch: weft long. 74°, north lat. 48° 15′.

JULIAN PERIOD, in chronology, a fyftem or period of 7980 years, found by multiplying the three cycles of the fun, moon, and indiction into one another. See the article CYCLE.

This period was called the julian, not becaufe invented by Julius Cæfar; fince the julian epocha was not received till the year 4669, but becaufe the fyftem confifts of julian years. This epocha is not hiftorical, but artificial, being invented only for the ufe of true epochas: for Scaliger confidering that the calculation was very intricate in ufing the years of the creation, the years before Chrift, or any other epocha whatever, in regard that another perfon could not underftand what year this or that writer meant; to remove fuch doubts in the computation of time, he thought of this period; which commencing 710 years before the beginning of the world, the various opinions concerning other epochas may commodioufly be referred to it. See EPOCHA.

The moft remarkable ufes of the julian period are as follow. 1. That we can explain our mind to one another, for every year in this period has its peculiar cycles, which no other year in the whole period has; whereas, on the contrary, if we reckon by the years of the world, we muft firft enquire how many years any other reckons from the creation to the year of Chrift, which multiple-inquifition is troublefome and full of difficulties, according to the method of other periods. 2. That the three cycles of the fun, moon, and indiction, are eafily found in this period. 3. That if it be known how the chronological characters are to be found in this period, and how the years of any other epocha are to be connected with the years of it, the fame characters alfo may, with little labour, be applied to the years of all other epochas. See the article CHARACTER.

JULIERS, the capital of the dutchy of the fame name, fituated on the river Roer, twenty miles weft of Cologn, and as many eaft of Maeftricht: eaft long. 6°, north lat. 50° 55′.

JULIS, or JULIA, in ichthyology, names given to the variegated fmall labrus, with two large teeth in the upper jaw. See the article LABRUS.

JULPHA, or *Old* JULPHA, once the capital of Armenia, but now in ruins, the inhabitants being tranfplanted to a town within a mile of Ifpahan, called New Julpha, and there they carry on a foreign trade with all the countries in Afia. The fituation of Old Julpha was in eaft long. 46°, north lat. 39°.

JULUS, in botany, the fame with what is otherwife called catkins or amentaceous flowers. See AMENTACEOUS.

JULUS is alfo the name of an infect very common among rubbifh, and called in englifh the gally-worm: it is furnifhed with a great number of feet, has the power of rolling itfelf up like a ball when touched, and is efteemed a very valuable medicine in the jaundice and fuppreffion of urine.

JULY, in chronology, the feventh month of the year, fo called in honour of Julius Cæfar; before whofe time it was known by the name of quintilis, as being the fifth month of the old roman year. See the articles MONTH and YEAR.

JUMENTA, in zoology, the name by which Linnæus calls the fifth order of quadrupeds, the characteriftic of which is, that the teeth of all the animals belonging to it are placed in a different manner from the other five orders. See the article QUADRUPEDS.

To this order belong the elephant, rhinoceros, hippopotamus, horfe, and hog. See ELEPHANT, RHINOCEROS, &c.

JUNCO, the *reed fparrow*, in ornithology. See the article SPARROW.

JUNCUS, the RUSH, in botany, a genus of the hexandria-monogynia clafs of plants, which has no corolla; but the perianthium, when frefh and coloured, greatly imitates one: the fruit is a coloured capfule, of a triquetrous figure, and formed of three valves, containing a few roundifh feeds.

Authors have divided the feveral fpecies of juncus into what they call rufhes, and rufh-graffes, from their having or wanting leaves; but the fructifications in both are the fame.

JUNE, the fixth month of the year, during which the fun enters the fign of Cancer.

Cancer. See MONTH and YEAR.

In this month is the ſummer ſolſtice. See the article SOLSTICE.

JUNGERMANNIA, a genus of the cryptogamia-algæ claſs of plants, conſiſting uſually of ſtalks furniſhed with leaves, diſpoſed in a pinnated or ſquamoſe manner, ſometimes of leaves only: the male flower ſtands on a long ſtraight pedicle, which ariſes out of a calyx growing from the upper part of the ſurface: it has neither calyx nor corolla, but conſiſts of an anthera, which is at firſt of an oval figure, but afterwards opens into four ſegments, and remains in this ſtate a long while on the plant; the female flower has no pedicle, there is no viſible calyx or corolla, but all that is ſeen is a number of ſeeds lying naked in a cluſter, and ſometimes only a ſingle one.

This is the lichenaſtium of Dillenius, and the muſcoides of Micheli.

JUNIPER, *juniperus*, in botany, a genus of the dioecia-monadelphia claſs of plants, without any male corolla; the female flower conſiſts of three rigid and acute petals: the fruit is a roundiſh, fleſhy berry; and the ſeeds are three oblong oſſicles, convex on one ſide, and angulated on the other.

Juniper berries are to be choſen freſh, plump, full of pulp, and of a ſtrong taſte; and theſe, when uſed in medicine, are powerful attenuants, diuretics, and carminatives: they diſſolve viſcid humours in the firſt paſſages, and are conſequently a remedy for the flatulencies which theſe diſorders occaſion. They are given in caſes of the gravel and other nephritic complaints, in infarctions of the viſcera, and in ſuppreſſions of the menſes, and are often made ingredients in clyſters. The berries chewed, or the eſſential oil taken only in a few drops, give the urine the ſame ſweet violet-ſcent that it has after taking turpentine. But theſe berries are not to be given indiſcriminately; for in hot habits, they often counteract the very purpoſes intended to be anſwered by them, and their uſe ſucceeded with heat, and even ſuppreſſion of urine, flatulencies, and ſwellings of the ſtomach and inteſtines: therefore in all caſes, where there is danger of an inflammation, either in the primæ viæ, or in the kidneys, the uſe of juniper-berries is to be avoided. We keep no preparation of them in the ſhops, except the eſſential oil made by diſtillers with water in the uſual way; and this is ſeldom made at home, but the imported kind is commonly adulterated with oil of turpentine. We uſed to keep a diſtilled ſpirituous water of juniper in the ſhops, but the vulgar getting an opinion of its being a pleaſant dram, the making of it became the buſineſs not only of the apothecary, but of the diſtiller, who ſold it under the name of geneva.

JUNK, in the ſea-language, old cables cut into ſhort pieces, and given to boatſwains for making ſwabs, plats, and nippers; as alſo to the ſhip-carpenters, and to poor people, to be picked into oakam, for caulking ſhips, *&c.*

JUNO, in aſtronomy, the name by which ſome call the ſecond of jupiter's ſatellites. See the article JUPITER.

JUNTA, JUNTO, or JUNCTO, in matters of government, denotes a ſelect council for taking cognizance of affairs of great conſequence, which require ſecrecy.

In Spain and Portugal, it ſignifies much the ſame with convention, aſſembly, or board among us: thus we meet with the junta of the three eſtates, of commerce, of tobacco, *&c.* See BOARD, *&c.*

IVORY, *ebur*, in natural hiſtory, *&c.* a hard, ſolid and firm ſubſtance, of a white colour, and capable of a very good poliſh. It is the tuſk of the elephant, and is hollow from the baſe to a certain height, the cavity being filled up with a compact medullary ſubſtance, ſeeming to have a great number of glands in it. It is obſerved that the Ceylon-ivory, and that of the iſland of Achem do not become yellow in the wearing, as all other ivory does; for this reaſon the teeth of theſe places bear a larger price than thoſe of the coaſt of Guinea.

The duty on ivory, on its being imported into this kingdom, is 1 s. $11\frac{10}{100}$d. the pound, out of which a drawback of 1 s. $8\frac{25}{100}$d. the pound, is allowed on its exportation.

To ſoften IVORY *and other bones*, lay them for twelve hours in aqua fortis, and then three days in the juice of beets, and they will become ſo ſoft that they may be worked into any form. To harden them again, lay them in ſtrong vinegar. Dioſcorides ſays, that by boiling ivory for the ſpace of ſix hours with the root of mandragoras, it will become ſo ſoft that it may be managed as one pleaſes.

To ſoften and whiten IVORY, take white wine vinegar, thrice diſtilled, and boil red ſage leaves in it with a little quicklime; put in the ivory while the liquor is

is boiling hot, and it will ſoon become ſofter and much whiter than it was before. Ivory may alſo be whitened and cleaned from ſpots in the following manner: lay it in quick-lime and pour a little water over it, but not too much, that the heat may not be too great, leſt it ſcale and become brittle.

Ivory diſtilled in a retort yields a ſmall quantity of an inſipid and ſcentleſs phlegm; then a larger quantity of a pungent liquor, like ſpirits of harts-horn; after this comes over a brown fœtid oil, and a moderate quantity of volatile ſalt concretes about the ſides of the receiver. Theſe have all the ſame virtues with the preparations of harts-horn; and the raſpings of ivory, in the ſame manner as the ſhavings of harts-horn, boil into a jelly with water, and have the ſame reſtorative virtues.

Staining and marbling of IVORY. 1. Of a fine coral-red; make a lye of wood-aſhes, of which take two quarts, pour it into a pan upon one pound of braſil; to this add one pound of alum; boil it for half an hour; then take it off, and put in the ivory or bone, and the longer either of theſe continue in the liquor, the redder they will be. 2. Of a fine green; take two parts of verdegreaſe, and one part of ſal-armoniac; grind them well together, pour ſtrong white wine vinegar on them, and putting your ivory into this mixture, let it lie covered till the colour has penetrated, and is as deep as you would have it. If you would have it ſpotted with white, ſprinkle it with wax; or if you would have it marbled, cover it with wax, and ſcrape it off in veins, having all the lines uncovered which you deſire to have ſtained. 3. Of black; take litharge and quick-lime, of each an equal quantity; put them in rain-water over the fire till it begins to boil; in this put the bone or ivory, ſtirring them well about with a ſtick; and afterwards, when you ſee the ivory receive the colour, take the pan from the fire, ſtirring the ivory all the while till the liquor is cold. 4. Marbling upon ivory is performed thus; melt bees-wax and tallow together, lay it over the ivory, and with an ivory bodkin open the ſtrokes that are to imitate marbling; pour the ſolution of ſome metal on them, and when it has ſtood a ſhort time, pour it off; when it is dry, cover the ſtrokes again with wax, and open ſome other veins with your bodkin for another metallic ſolution; and this repeat to the number of colours you deſign to give it. The ſolution of gold gives it a purple; of copper, a green; of ſilver, a lead-black; of iron, a yellow and brown. By this method you may alſo imitate tortoiſe-ſhell and ſeveral other ſubſtances on ivory.

IVORY-BLACK. See *Ivory* BLACK.

JUPITER, ♃, in aſtronomy, one of the ſuperior planets, remarkable for its great brightneſs. See the articles PLANET and COPERNICAN SYSTEM.

Jupiter appears almoſt as large as Venus, but is not altogether ſo bright; he is eclipſed by the moon, by the ſun, and even by mars. He has three appendages, called zones, or belts, which Sir Iſaac Newton thinks are formed in his atmoſphere. In theſe are ſeveral *maculæ*, or ſpots; from whoſe motion the motion of jupiter round its axis is ſaid to have been firſt determined. See plate CXLVIII. fig. 3. Its orbit is ſituated between thoſe of ſaturn and mars, and is therefore called one of the ſuperior planets: it has a rotation round its axis in 9 hours 56 minutes; and a periodical revolution round the ſun in 4332 days, 12 hours, 20′, 9″. It is the biggeſt of all the planets; its diameter to that of the ſun appears, by aſtronomical obſervations, to be as 1077 is to 10000; to that of ſaturn, as 1077 to 889; to that of the earth, as 1077 to 104. The force of gravity on its ſurface is to that on the ſurface of the ſun, as 797.15 is to 10000; to that of ſaturn, as 797.15 to 534.337; to that of the earth, as 797.15 to 407.832. The denſity of its matter is to that of the ſun, as 7404 to 10000; to that of ſaturn, as 7404 to 6011; to that of the earth, as 7404 to 3921. The quantity of matter contained in its body is to that of the ſun as 9.248 to 10000; to that of ſaturn, as 9.248 to 4.223; to that of the earth, as 9.248 to 0.0044.

The mean diſtance of jupiter from the ſun is 5201 of thoſe parts, whereof the mean diſtance of the earth from the ſun is 1000, though Kepler makes it 5196 of thoſe parts. Mr. Caſſini calculates jupiter's mean diſtance from the earth to be 115000 ſemidiameters of the earth. Gregory computes the diſtance of jupiter from the ſun to be above five times as great as that of the earth from the ſun; whence he gathers, that the diameter of the ſun, to an eye placed in jupiter, would not be a fifth part of what it appears to us; and therefore his diſk would be twenty-

twenty-five times lefs, and his light and heat in the fame proportion.

The inclination of jupiter's orbit, that is, the angle formed by the plane of its orbit, with the plane of the ecliptic, is 1° 20′; his excentricity in 250; and Huygens computes his furface to be four hundred times as large as that of the earth.

As jupiter is one of the three fuperior planets, that is, one of the three which are above, or without, the orbit of the earth: hence it has no parallax, its diftance from the earth being too great to have any fenfible proportion to the diameter of the earth. Tho' it be the greateft of all the planets, yet its revolution about its axis is the fwifteft. Its polar axis is obferved to be fhorter than its equatorial diameter; and Sir Ifaac Newton determines the difference to be as 8 to 9; fo that its figure is a fpheroid, and the fwiftnefs of its rotation occafions this fpheroidifm to be more fenfible than that of any other of the planets.

Jupiter has four moons, or fatellites, that attend him, which, at different diftances, and with different periods, perform conftant revolutions round him; that which is next to him, is no further removed than 2 $\frac{5}{6}$ of his own diameters, and turns round in 1 day, 18 hours and an half. The fecond, at the diftance of 4 $\frac{1}{2}$ diameters, defcribes its orbit in the fpace of 3 days and 13 hours. The third is removed from jupiter 7 of his diameters, and finifhes its circulation in feven days 4 hours. The furthermoft completes its period in the fpace of 16 days, 16 $\frac{1}{2}$ hours, at the diftance of 12 diameters of jupiter. Thefe *jovial* planets were firft difcovered by Galileo, by the help of the telefcope which he firft invented; and by them he increafed the number of the celeftial bodies, and called them medicean ftars, in honour of the dukes of Tufcany, with whofe name he dignified them.

The orbits of jupiter's moons lie nearly in the plane of the ecliptic, which is the reafon why their motion is apparently in a right line, and not circular, as it really is. To underftand this, let S (plate CXLIX. fig. 1.) be the fun, T the earth in its orbit T H, I the planet jupiter in his orbit A I B, and in the center of the four orbits of his moons. Then, becaufe the plane of thofe orbits does nearly pafs through the eye, the real motion of the fatellite in the periphery will be apparently in the diameter of the orbit, which is at right angles to the line joining the center of the earth and jupiter.

Thus fuppofing the earth at R, if DC be drawn through the center of jupiter perpendicular to R I, the motion of each moon and their places will appear to be in that line. Thus, if the exterior moon be at E or F, it will appear to be at I either upon or behind the center of jupiter; if the moon move from E to K, it will appear to have moved from I to L; and when it moves from K to C, it will appear to move from L to C. Again, while the fatellite moves from C to M, it will appear to move from C to L; and as it goes from thence to F, it apparently moves from L to I. Thus alfo, on the other fide of the orbit, while the fatellite defcribes the quadrant F D, its apparent motion will be from I to D; and then from D to I again, as it comes from D to E.

Whence, fince this is the cafe of each fatellite, it appears, that while each fatellite defcribes the remote half of its orbit CFD, its apparent motion will be direct, or from weft to eaft along the line CD; and while it defcribes the other half DEC, its apparent motion is retrograde, or from eaft to weft back again along the fame line from D to C; fo that each fatellite traverfes the diameter of its orbit twice in each revolution.

Thefe four moons muft make a very pleafing fpectacle to the inhabitants of jupiter, if there are any; for fometimes they rife altogether, fometimes they are all in the meridian, ranged one under another; and fometimes all appear in the horizon, and frequently undergo eclipfes; the obfervations whereof are of fpecial ufe in determining the longitude.

The day and night are of the fame length in jupiter all over his furface, *viz.* five hours each; the axis of his diurnal rotation being nearly at right angles to the plane of his annual orbit. Though there be four primary planets below jupiter, yet an eye placed on his furface would never perceive any of them; unlefs, perhaps, as fpots paffing over the fun's disk, when they happen to come between the eye and the fun. The parallax of the fun, viewed from jupiter, will fcarce be fenfible; no more than that of faturn, neither being much above twenty feconds; fo that the fun's apparent diameter in jupiter will not be above fix minutes. The outermoft of his fatellites will appear almoft as big as the moon does in

us; *viz.* five times the diameter and twenty-five times the disk of the sun. Doctor Gregory adds, that an astronomer in jupiter would easily distinguish two kinds of planets, four nearer him, *viz.* the satellites; and two, *viz.* the sun and saturn, more remote: the former however, will fall vastly short of the sun in brightness, notwithstanding the great disproportion in the distances and apparent magnitude. From these four different moons, the inhabitants of jupiter will have four different kinds of months, and the number of moons in their year will not be less than 4500. These moons are eclipsed as often as, being in opposition to the sun, they fall within the shadow of jupiter: and again, as often as, being in conjunction with the sun, they project their shadows to jupiter, they make an eclipse of the sun to an eye placed in that part of jupiter where the shadow falls. But in regard the orbits of these satellites are in a plane which is inclined to, or makes an angle with, the plane of jupiter's orbit, their eclipses become central when the sun is in one of the nodes of these satellites; and when out of this position, the eclipses may be total, though not central, because the breadth of jupiter's shadow is nearly decuple to that of the breadth of any of the satellites; and the apparent diameter of any of these moons is nearly quintuple the apparent diameter of the sun. It is owing to this remarkable inequality of diameters, and the small inclination the plane of the orbits of the satellites has to the plane of jupiter's orbit, that in each revolution there happen eclipses both of the satellites and of the sun; though the sun be at a considerable distance from the nodes. Further; the inferior among these satellites, even when the sun is at the greatest distance from the nodes, will occasionally eclipse and be eclipsed by the sun to an inhabitant of jupiter; though the remotest of them, in this case, escapes falling into jupiter's shadow, and jupiter into his, for two years together. To this it may be added, that one of these satellites sometimes eclipses another where the phasis must be different, nay frequently opposite to that of the satellite falling into the shadow of jupiter just mentioned; for in this the eastern limb immerges first, and the western immerges last; but, in the others, it is just the reverse. The shadow of jupiter, though it reaches far beyond its satellites, yet falls much short of the distance of any planet; nor could any other planet, saturn alone excepted, be immerged in it, even though it were infinite. Nor could the shadow of jupiter reach that of saturn, unless jupiter's diameter were half of that of the sun; whereas, in effect, it is not one ninth of it. The courses of jupiter's satellites, and their various eclipses, would render navigation very sure and easy on the globe of jupiter. Even we, at this distance, can make very good use of them: those eclipses being found one of our best means for determining the longitude at sea. See LONGITUDE.

JUREA, or JURA, a strong city in Italy, in the province of Piedmont, situated on the river Doria, subject to the king of Sardinia: east long. 7°, 36′; north lat. 45°, 22′.

JURISDICTION, in law, signifies the power and authority with which any person is invested in administring justice in cases of complaint laid before him.

Jurisdictions are either ecclesiastical or secular; ecclesiastical belongs to bishops and their deputies. See BISHOP.

Secular jurisdiction belongs to the king and his judges. The courts and judges at Westminster are not restrained to any county or place, they having jurisdiction all over England; but other courts are confined to their particular jurisdictions, which if they go beyond, all their proceedings become erroneous. As to inferior jurisdictions, they are of several sorts; one of which is to hold pleas, and the plaintiff may either sue there or in the king's courts. Another is the conusance of pleas; where a right is invested in the lord of the franchise to hold pleas. A third kind is an exempt jurisdiction, as where the king grants to the inhabitants of a particular city or corporation, the privilege of being sued only within their own city, &c.

JURISPRUDENCE, the science of what is just or unjust; or the knowledge of laws, rights, customs, statutes, &c. necessary for the administration of justice.

JURIS UTRUM, in law, a writ in behalf of a clergyman whose predecessor has alienated the lands belonging to his church. This writ is also granted in order to try whether free alms belong to a church where they are transferred. A successor of a deceased clergyman may also have

have this writ againſt a man, who intrudes into lands and tenements; a vicar may alſo have this writ even againſt the parſon, for the glebe of his vicarage, &c.

JUROR, in law, ſignifies any perſon ſworn on a jury. See the next article.

JURY, a certain number of men ſworn to enquire into and try a matter of fact, and to declare the truth upon ſuch evidence as ſhall appear before them.

Juries are, in theſe kingdoms, the ſupreme judges in all courts and in all cauſes in which either the life, property or reputation of any man is concerned: this is the diſtinguiſhing privilege of every Briton, and one of the moſt glorious advantages of our conſtitution; for as every one is tried by his peers, the meaneſt ſubject is as ſafe and as free as the greateſt. All criminal cauſes muſt firſt be tried by a grand jury, which commonly conſiſts of twenty-four men of greater note than the petit jury, who are choſen indifferently out of the whole county, and no man can ſuffer the diſgrace of being tried in any ignominious cauſe, without their firſt finding him guilty; if they find him innocent, he is immediately diſcharged; but if otherwiſe, they only find an indictment, on which he is tried, and finally acquitted or convicted by the verdict of the petit jury, who are not only to be returned from the county where the fact was done, but near neighbours, ſuch as are moſt ſufficient and leaſt ſuſpicious; to prevent partiality, the names of the perſons impannelled are wrote on ſeveral pieces of paper of equal ſize, and delivered by the under-ſheriff to the judge's Marſhal, who cauſes them to be rolled up, all in the ſame manner, and put together in a box, and when any cauſe is brought to trial, ſome indifferent perſon is to draw out twelve of theſe papers, and the perſons whoſe names are drawn, if not challenged, are to be the jury to try the cauſe; and in caſe any are challenged, and ſet aſide, or do not appear, then a further number is to be drawn till there is a full jury. See the article CHALLENGE.

When a jury-man is ſworn, he muſt not depart from the bar on any account whatſoever till the evidence is given, without leave of the court; and if that be obtained, he muſt have a keeper with him. As ſoon as the whole evidence is ſummed up, the jury are to be kept together till they are all of one mind, and unanimous in bringing in their verdict, without being admitted to the ſpeech of any perſon, and without meat, drink, fire or candle. They are fineable if they agree to caſt lots for their verdict, and alſo for being tampered with in relation to it. But as they are the ſole judges of the fact, they are not fineable for giving a verdict contrary to the ſentiments of the court; nor even for giving it contrary to what may appear plain evidence, becauſe the law preſumes that they may have ſome other evidence beſides what is given in court: but where any corruption appears, a jury may be attainted for going contrary to evidence; and if a juror takes any thing either of the plaintiff or defendant for giving a verdict, he is to pay ten times as much as he has taken, or ſuffer a year's impriſonment; yet in trying cauſes, juries are to have their charges allowed them by the court. In all caſes of difficulty, it is ſafeſt for the jury to find the ſpecial matter, and to leave it to the judges to determine how the law ſtands upon the fact.

Infants, perſons of ſeventy years of age, and upwards, clergymen, apothecaries, &c. are exempted from ſerving upon juries; and barons, and all above them, are not to ſerve in an ordinary jury. Jurors, in London, muſt not only be houſekeepers, but muſt have land or goods worth one hundred pounds; and they may be examined on oath as to that point. 3 Geo. II. c. 25.

The qualifications of a jury-man for a county, is ten pounds *per annum*, either in freehold or copyhold-eſtate within the ſame county; but cities, boroughs, and corporate towns, are excepted by the ſtatutes: however, no jury is obliged to appear upon a trial at Weſtminſter where the offence was committed thirty miles off, except it be required by the king's attorney-general. According to uſage, the ſheriff ſhould return twenty-four jurors, in order to ſpeed the trial in caſe of challenge, ſickneſs, &c. and ſhould he only return twelve, purſuant to the the writ, he is liable to be amerced. By 4 and 5 W. and M. no ſheriff, bailiff, &c. under the penalty of ten pounds, ſhall return any perſon to ſerve on a jury, who has not been duly ſummoned ſix days before his appearance, nor under the like penalty ſhall he accept of money or other reward for excuſing the appearance of a juryman: jurymen neglecting to appear, ſhall be fined in a ſum not exceeding

ceeding five pounds, nor lefs than forty fhillings; except they can give a reafonable excufe for their non-appearance: and, in cafe a juryman does appear, but refufes to be fworn, or to give a verdict, an attachment may be iffued againft him. Lifts of jurors, according to the ftatutes of 4 and 5 W. and M. and 7 and 8 W. III. are now to be made from the rates of each parifh, and fixed on the doors of churches, &c. twenty days before Michaelmas, that public notice may be given of perfons omitted who are qualified, or of perfons inferted who are not fo. after which, the lifts being fettled by the juftices of the peace at the quarter-feffions, duplicates are to be delivered to the fheriffs by the clerks of the peace; and the names contained in thefe lifts muft be entered alphabetically by the fheriffs in a book to be kept for that purpofe, together with their additions and places of abode. The fheriffs are liable to be fined for returning other perfons; and alfo if they return jurors that have ferved two years before. Sheriffs, on the return of writs of *venire facias*, are to annex a pannel of the names of a competent number of jurors, mentioned in the lifts, and not lefs than forty-eight in any county, nor more than feventy-two, unlefs they are otherwife directed by the judges, which jurors fhall be fummoned to ferve at the affizes, &c.

When it is conceived that an indifferent and impartial jury will not be returned by the fheriff, a fpecial jury is allowed; in which cafe the court, upon a motion made, will order the fheriff to attend the fecondary of the king's bench with his book of freeholders of the county, and the fecondary is to mark a jury, in the prefence of the attornies on both fides: alfo, if a caufe of confequence is to be tried, the court of king's bench, on a motion upon an affidavit made, will make a rule for the fecondary to name forty-eight freeholders, out of which each party is to ftrike out twelve, one at a time, the plaintiff's attorney beginning firft, and the remainder of the jurors will be the jury for the trial: though the nomination of a fpecial jury ought to be in the prefence of the attornies on each fide; yet in cafe either of them neglects, or refufes to attend, the fecondary may proceed, and ftrike out twelve for the attorney that makes default. By 3 G. II. c. 25. on the motion of the profecutor, plaintiff or defendant, on trials of iffues on indictments, and in all actions whatfoever, the courts of Weftminfter are authorifed to order a fpecial jury to be ftruck in the fame manner as upon trials at bar. Where a fpecial jury is ordered by a rule of court, in any caufe arifing in a city, corporation, &c. this jury is to be taken out of the lifts or books of the perfons qualified, which are to be produced by the fheriffs, &c. before the proper officer. The fame indulgence is granted both to merchants and foreigners; for where two merchants are plaintiff and defendant, the court may be moved for a jury of merchants to try the iffue between them; and if either of the parties in the fuit be an alien, the jury, at the defire of the party, is to be compofed of half foreigners and half Englifh. See the articles PEER and VERDICT.

JURY-MAST, whatever is fet up in room of a maft that has been loft in a ftorm or in an engagement, and to which a leffer yard, ropes and fails are fixed.

JUS, in its general acceptation, fignifies law or right.

JUS ACCRESCENDI, in law, is the right of furvivorfhip between two joint tenants.

JUS CORONÆ, fignifies, in general, the rights of the crown. Thefe are a part of the laws of the kingdom, though they differ in many things from the general laws relating to the fubject. See the article KING.

JUS DUPLICATUM, in law, is a double right, and is ufed when a perfon has the poffeffion of a thing, as well as a right to it.

JUS GENTIUM, the law of nations, or the laws eftablifhed between different kingdoms and ftates, in relation to each other. See the article LAW.

JUS HEREDITATIS, the right or law of inheritance.

JUS PATRONATUS, in the cannon-law, is the right of prefenting a clerk to a benefice; or a kind of commiffion granted by the bifhop to enquire who is the rightful patron of a church. This commiffion is directed to fix clergymen, and fix laymen who refide near the church, and thefe are to enquire. 1. Whether the church is void? 2. Who made the laft prefentation? 3. Who is the rightful patron? &c. See the article PATRON.

JUS POSSESSIONIS, in law, is a right of feifin or poffeffion, as jus proprietatis is the right of ownerfhip of lands, &c.

JUS PRESENTATIONIS, in law, the right a patron enjoys of prefenting his clerk to the

the ordinary, to be admitted, inftituted, and inducted into a church.

JUS RECUPERANDI, INTRANDI, *&c.* fignify a right of recovering and entering into lands, *&c.*

JUSSIÆA, or JUSSIEUA, the *Catalonian Jasmine*, in botany, a genus of the decandria-monogynia clafs of plants, the corolla whereof confifts of five roundifh, patent petals; the fruit is oblong, thick, coronated, and opens longitudinally; the feeds are numerous, and difpofed in feries.

JUST, a fportive combat on horfeback, man againft man, armed with lances.

The difference between jufts and tournaments, according to Du Cange, confifts in this, that the latter is a genus of which the former is only a fpecies. Tournaments included all kinds of military fports and engagements, which were made out of gallantry and diverfion. Jufts were thofe particular combats, where the parties were near each other, and engaged with lance and fword: add, that the tournament was frequently performed by a number of cavaliers, who fought in a body; whereas the juft was a fingle combat of one man againft another. Though the jufts were ufually made in tournaments, after a general rencounter of all the cavaliers, yet they were fometimes fingly and independent of any tournament.

Antiently jufts and tournaments made a part of the entertainment of all folemn feafts and rejoicings. The Spaniards borrowed thefe exercifes from the Moors, and call them *juego de cannus*, reed or cane-plays. Some take them to be the fame with the *ludus trojanus*, antiently practifed by the youth of Rome.

He who appeared for the firft time at a juft, forfeited his helmet, or cafque, unlefs he had forfeited before at a tournament.

JUSTICE, *juftitia*, in a moral fenfe, is one of the four cardinal virtues, which gives every perfon his due.

JUSTICE, *jufticiarius*, in a legal fenfe, a perfon deputed by the king to adminifter juftice to his fubjects, whofe authority arifes from his deputation, and not by right of magiftracy.

In the courts of king's bench and common pleas there are two judges ftiled juftices, each of whom retains the title of lord during the time of his continuing in office. The firft of thefe, who is ftiled lord chief juftice of England, has a very extenfive power and jurifdiction in pleas of the crown, and is particularly intrufted not only with the prerogatives of the king, but likewife the liberty of the fubject. He hears all pleas in civil caufes brought before him in the court of king's bench, and alfo the pleas of the crown: while, on the other hand, the lord chief juftice of the common pleas has the hearing of all civil caufes between common perfons. Befides the lords chief juftices, there are feveral other juftices appointed by the king for the execution of the laws; fuch as the lords juftices in eyre of the forefts, who are two juftices appointed to determine all offences committed in the king's forefts; juftices of affize, who, by a fpecial commiffion, were formerly fent to hear caufes in this or that county, for the eafe of the fubject; and thefe judges continue twice a year to pafs the circuits by two and two throughout all England, difpatching the different bufinefs they meet with by different commiffions; for they have one commiffion to take affizes, another of oyer and terminer, that is, to hear and determine caufes, and another of goal-delivery: from whence they are called juftices of oyer and terminer, of goal-delivery, *&c.* They are alfo called juftices of nifi prius, and fo denominated from the words ufed in a common form of adjournment of a caufe in the court of common pleas. See NISI PRIUS.

JUSTICES *of the peace*, are perfons appointed by the king's commiffion to keep the peace of the county in which they refide; and fome of thefe, who are of fuperior rank or quality, are called juftices of the quorum, and without the prefence or affent of thefe, or at leaft one of them, no bufinefs of importance can be difpatched. Juftices of the peace ought to be appointed out of the moft fufficient perfons in the county, as well as thofe of the greateft reputation. They ought to poffefs an eftate of at leaft 100 l. *per annum*, in freehold or copyhold, for life, or for the term of twenty-one years, without incumbrances; and if a juftice of the peace, not thus qualified, prefumes to act in that office, he is liable to the penalty of 100 l. Every juftice of the peace has a feparate authority for doing all the different acts relating to his office, as for commitments, binding to the good behaviour, *&c.* they are authorized to take informations againft perfons committing treafon, to grant warrants for apprehending them, and committing

them

them to prison : they may also commit all felons in order to bring them to trial; and at the same time, they are to bind over the accusers to prosecute at the assizes: and if they neglect to certify such examinations and informations at the next goal-delivery, or do not bind over the prosecutors, they are liable to be fined. Where any person is esteemed dangerous, and likely to break the peace, a justice may require a recognizance with a large penalty of such person for his keeping the peace, and on his not procuring sureties for his good behaviour, he may send him to prison: but where a person hears of a peace-warrant being out against him, he may go to another justice, and there give surety of the peace, by which means he will prevent his being held on the first warrant. Justices of the peace frequently make up petty quarrels and breaches, where the king is not intitled to a fine; but they are not to take money for making agreements: if a justice is guilty of any misdemeanor, an information will lie against him in the king's bench, where he may be punished by fine and imprisonment. Two or more justices of the peace have power jointly to take indictments, and try offenders at the quarter-sessions: and in many cases they are impowered, by statute, to act where their commission does not extend: they are to hold their sessions four times a year, on the first week after Epiphany, Easter, St. Thomas a Becket, which is the 7th of July, and Michaelmas: at the quarter-sessions they may try persons for petit-larceny, and other small felonies; but felonies of a higher nature are to be tried at the assizes.

JUSTICES *within liberties*, are justices of the peace who have the same authority in cities or other corporate towns, as the others have in counties, and their power is the same, only these last have the assize of ale and beer, wood and victuals, *&c.*

JUSTICE-SEAT, is the highest forest court, always held before the lord chief justice in eyre of the forest; in which court fines are set for offences, and judgments given.

JUSTICIA, in botany, a genus of the diandria-monogynia class of plants, the corolla whereof consists of a single petal; the tube is gibbous; the limb ringent; the upper lip is oblong and emarginated; the lower lip is of the same length with that, and is reflex and obtusely trifid: the fruit is an oblong, obtuse capsule, narrow at the base, composed of two valves, and containing two cells; the partition placed contrarywise to the valves, opens by an elastic ungues: the seeds are roundish.

JUSTICIAR, in our old laws, an officer instituted by William the conqueror, as the chief officer of state, who principally determined in all cases civil and criminal. He was called in latin *capitalis justiciarius totius angliæ.*

JUSTICIARY, or *court of* JUSTICIARY, in Scotland, a court of supreme jurisdiction in all criminal cases.

This court came in place of the justice-eyre or justice-general, which was last in the person of the earl of Argyle, who transacted for it with king Charles I. but being made justice-general of all the islands, which gave rise to great debates between him and some hereditary sheriffs there, that jurisdiction was taken away by parliament in 1672, and was erected into a justice or criminal court, consisting of a justice-general alterable at the monarch's pleasure, justice-clerk, and five other judges, who are lords of the session. This court commonly sits upon Mondays, and has one ordinary clerk, who has his commission from the justice-clerk. They have four macers, and a doomster appointed by the lords of the session.

The form of the process is this: the clerk raises a libel or indictment upon a bill passed by any of the lords of that court, at the instance of the pursuer, against the defendant or criminal, who is immediately committed to prison after citation. When the party, witnesses, great assize, or jury of forty-five men, are cited, the day of compearance being come, fifteen of the great assize is chosen to be the assize upon the pannel, or prisoner at the bar. The assize sits with the judges to hear the libel read, witnesses examined, and the debates on both sides, which is written verbatim in the adjournal books. The king's advocate pleads for the pursuer, being the king's cause, and other advocates for the pannel. The debates being closed, the judges find the libel or indictment either non-relevant, in which case they desert the diet, and assoil or absolve the party accused; or, if relevant, then the assize or jury of fifteen is removed into a closer room, none being present with them, where they choose their chancellor and clerk, and consider the libel, deposition, and debates;

bates; and bring in their verdict of the pannel sealed guilty or not guilty: if not guilty, the lords absolve; if guilty, they condemn and declare their sentence of condemnation, and command the sentence to be pronounced against the pannel by a macer and the mouth of the doomster.

The lords of the justiciary, likewise go circuits twice a year into the country. See the article CIRCUIT.

JUSTICIES, a writ directed to a sheriff, by virtue of which he is impowered to hold a plea of debt in his county-court for a sum above 40 s. tho' by his ordinary power he has only cognizance of sums under 40 s.

JUSTIFICATION, in law, signifies a maintaining, or shewing a sufficient reason in court, why the defendant did what he is called to answer. Pleas in justification must set forth some special matter: thus, on being sued for a trespass, a person may justify it by proving, that the land is his own freehold; that he entered a house, in order to apprehend a felon; or by virtue of a warrant, to levy a forfeiture; or, in order to take a distress; and in an assault, that he did it out of necessity.

JUTES, the antient inhabitants of Jutland, in Denmark.

JUTLAND, a peninsula of Denmark, antiently called the Cimbrian Chersonese, situated between 8° and 11° of east long. and between 55° and 58° of north lat. bounded by the Categate sea, which separates it from Norway, on the north; by the same sea, which divides it from the danish islands and Sweden, on the east; by Holstein, on the south; and by the German ocean, on the west. It is divided into north and south Jutland; the south being usually called Slefwic. The whole is about 180 miles in length, and 90 in breadth.

IVY, *hedera*, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of five oblong, patent petals, with their points bent; the fruit is a globose berry, having only one cell: the seeds are five in number, large, gibbous, and angulated on one part.

The qualities of this plant, in medicine, are drying and astringent; but it is rarely taken inwardly; it is more frequently used externally, for drying and healing achores: the berries are frequently given by the common people as a febrifuge: they purge up and down. A gum that distils from the trunk of the ivy-tree, upon being any ways cut, is reckoned a notable caustic, and is said to destroy the nits of the head.

Ground-IVY, *hedera terrestris*. See the article GROUND-IVY.

IXIA, CHAMÆLEON THISTLE, in botany, a genus of the triandria-monogynia class of plants, the corolla whereof consists of six oblong, equal, lanceolated petals: the fruit is a roundish, triquetrous capsule, composed of three valves, and containing three compressed cells, in each of which is a single roundish seed.

IXORA, in botany, a genus of the tetrandria-monogynia class of plants, the corolla whereof consists of a single petal; the tube is cylindric, very long and slender; the limb is plane, and divided into four oval segments; the fruit is a berry of a roundish figure, with only one cell: the seeds are four in number, convex on one side, and angular on the other.

JYNX, the WRY-NECK, in ornithology, a genus of bird of the pye-kind, the beak of which is smooth, and the nostrils hollowed: the tongue is very long, and of a rounded form, resembling a worm: the toes are four in number, two before and two behind.

Of this genus there is only one known species, called, from its singular manner of twisting its head about, the wry-neck. It is about the size of a lark, and is called by authors jynx, torquilla, turbo, &c.

K.

K or k, the tenth letter, and seventh consonant of our alphabet; being formed by the voice, by a guttural expression of the breath through the mouth, together with a depression of the lower jaw, and opening of the teeth. Its sound is much the same with that of the hard *c*, or *qu*; and it is used, for the most

moſt part, only before *e*, *i*, and *n* in the beginning of words; as *ken*, *kill*, *know*, &c. It uſed formerly to be always joined with *c* at the end of words, but is at preſent very properly omitted: thus, for *publick*, *muſick*, &c. we ſay, *public*, *muſic*, &c. However, in monoſyllables, it is ſtill retained, as *jack*, *block*, *mock*, &c.

Tho' it is ſeldom uſed in words derived from the French, as being altogether wanting in that language, yet we meet with *riſk*, *burleſk*, &c. in very good authors inſtead of *riſque*, *burleſque*: and, indeed, the former orthography is certainly moſt agreeable to the genius of the engliſh language.

The letter *k* is derived from the greek kappa, Κ or κ; it being unknown to the Romans, tho' we ſometimes meet with kalendæ inſtead of calendæ.

As a numeral, K denotes 250; and with a line over it, $\overline{\text{K}}$ 250000.

KAABA, or Caaba. See Caaba.

KABBALA, or Cabbala. See the article Cabbala.

KADARI, or Cadari. See Cadari.

KÆMPFERIA, in botany, a genus of the monandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle petal, with a long ſlender tube, and the limb is divided into ſix ſegments: the fruit is a roundiſh and ſomewhat trigonal capſule with three cells, each containing a conſiderable number of ſeeds.

The roots of this plant are the galangals of the ſhops. See Galangals.

KAFFA, or Caffa. See Caffa.

KAKENHAUSEN, a city of Livonia, ſubject to Ruſſia; eaſt long. 26°, north lat. 57°.

KALENDAR and Kalends. See the articles Calendar and Calends.

KALI, glasswort, in botany, a genus of the pentandria-digynia claſs of plants, which has no corolla or flower-petals: the fruit is a globoſe, unilocular capſule, covered by the cup, and containing a ſingle, large, and ſpiral ſeed.

Of the aſhes of kali is made ſoap, glaſs, alkali-ſalt, potaſh, *&c.* See the articles Soap, Glass, *&c.*

The method of preparing it is this: when dry, they burn it in certain pits, dug in the ground, which are cloſe covered up with earth, ſo that no air can come at the fire: by this means the matter is not only reduced to aſhes, but made into a very hard ſtone, like rock-ſalt, which they are forced to break with hammers to get it out. The beſt ſort is in little dry ſtones, of a blueiſh grey colour, and full of little eyes or holes. See the article Alkali.

KALIPH, or Caliph. See the articles Caliph and Caliphate.

KALLO, a town of upper Hungary, ſituated in a lake twenty miles ſouth-eaſt of Tockay.

KALMIA, in botany, a genus of the decandria-monogynia claſs of plants, the calyx of which is a ſmall permanent perianthium, cut into four oval, acute ſegments; the corolla conſiſts of a bill-ſhaped ſingle petal; the fruit is a globular depreſſed capſule, containing five cells ſeparated by five valves, in which are a great number of ſeeds.

KALMINECK, a city of Poland, in the province of Upper Podolia, and palatinate of Kamineck, ſituated on the frontiers of Moldavia: eaſt long. 26° 30′, north lat. 48°.

KANISHIA, a town ſituated on the river Drave, in Lower Hungary, 100 miles ſouth-weſt of Buda: eaſt long. 17° 6′, north lat. 47°.

KANOF, or Kaniow, a town of Ruſſia, ſituated on the river Nieper, in the Ukrain, ſeventy miles ſouth-eaſt of Kiow: eaſt long. 32°, north lat. 50°.

KAOLIN, one of the ſubſtances whereof china-ware is made; being no other than a kind of talc reduced to powder, and made into a paſte with water.

The peculiar property of kaolin is, that it is very difficultly, if at all vitrifiable: ſo that being mixed with petunſe, a ſubſtance eaſily vitrifiable, the mixture produces a ſemi-vitrification in the fire, which is what we call china or porcelain. See the article Porcelain.

Talc, therefore, ſeems the only ſubſtance capable of ſupplying the place of kaolin, in the manufacture of european porcelain; as being not only very difficultly vitrified, but keeping its tranſparence after the action of the moſt violent fire.

KASTRIL, or Kestril. See the article Kestril.

KAUSBEUREN, an imperial city of Germany, thirty-two miles ſouth of Augſburg: eaſt long. 10° 45′, north lat. 47° 50′.

KEBLA, an appellation given by the mahometans to that part of the world where the temple of Mecca is ſituated, towards which they are obliged to turn themſelves when they pray.

KECKLE, or KECKLING, in the fea-language, is the winding of old ropes about cables, to prevent them from galling.

KEDGE ANCHOR, a fmall one ufed in kedging. See the next article.

KEDGING, in the fea-language, is when a fhip is brought up or down a narrow river by means of the tide, the wind being contrary. To do this, they ufe to fet their fore-courfe, or fore-top fail and mifen, that fo they may flat her about; and if fhe happens to come too near the fhore, they let fall a kedge-anchor, with a hawfer faftened to it from the fhip, in order to turn her head about; which work is called kedging.

KEEL, the loweft piece of timber in a fhip, running her whole length from the lower part of her ftem to the lower part of her ftern poft. Into it are all the lower futtocks faftened; and under part of it, a falfe keel is often ufed.

KEELERS, among feamen, are fmall tubs, which hold ftuff for the caulking of fhips.

KEELSON, a principal timber in a fhip, fayed within-fide crofs all the floor-timbers; and being adjufted to the keel with fuitable fcarfs, it ferves to ftrengthen the bottom of the fhip.

KEEPER *of the foreft*, an officer that has the chief management of every thing belonging to a royal foreft, as well as the government of all the other officers. See the article FOREST.

KEEPER *of the great feal*, is a lord by his office, is ftiled lord-keeper of the great feal of Great-Britain, and is always one of the privy-council. All grants, charters and commiffions of the king under the great feal, pafs through the hands of the lord keeper, for without that feal, many of thofe grants, &c. would be of no force; the king being, in the interpretation of the law, a corporation, and therefore paffes nothing but by the great feal, which is alfo faid, to be the public faith of the kingdom, being in the higheft efteem and reputation.

Whenever there is a lord-keeper, he is invefted with the fame place, authority, preheminence, jurifdiction, or execution of laws, as the lord chancellor of Great-Britain is vefted with.

The lord-keeper is conftituted by the delivery of the great feal, &c.

KEEPER *of the privy feal*, is alfo a lord by his office, thro' whofe hands all grants, pardons, &c. pafs before they come to the great feal, and even fome things pafs this officer's hands which do not pafs the great feal at all. This officer is alfo one of the privy-council, yet was antiently called clerk of the privy feal. His duty is to put the feal to no grant, &c. without a proper warrant, nor with warrant where it is againft law, or inconvenient, but fhall firft acquaint the king therewith.

KEIL, a fortrefs fituated on the Rhine, in the circle of Swabia, in Germany, oppofite to Strafburg.

KEISERWAERT, a ftrong town of Germany in the circle of Weftphalia, and duchy of Berg, fituated on the Rhine, twenty-five miles north of Cologn: eaft long. 6° 8′, north lat. 51° 20′.

KELLINGTON, a borough town of Cornwall, thirteen miles fouth of Launcefton, which fends two members to parliament.

KELP, a fixed falt, or particular fpecies of pot-afh, procured by burning the weed called kali. See the article KALI.

Kelp, the ton, containing twenty hundred weight, each hundred weight containing 112 lb. pays on importation, 14 s. $4\frac{35}{100}$d. and draws back on exportation 12 s. $11\frac{25}{100}$d.

KELSO, a town of Scotland, in the fhire of Mers, or Roxburgh, fituated on the north fide the Tweed, twenty miles fouth weft of Berwick.

KEMPTEN, a city of Germany, in the circle of Swabia, fituated on the river Ifer: eaft long. 10° 7′, north lat. 47° 38′.

KENDAL, a market-town of Weftmoreland, twenty two miles fouth-weft of Appleby.

KENKS, in the fea-language, doublings in a rope or cable, when handed in and out, fo that it does not run eafy; or when any rope makes turns or twifts, and does not run free in the block, then it is faid to make kenks.

KENSINGTON, a pleafant village in the county of Middlefex, two miles weft of London; where is a royal palace, with large and fine gardens.

KENT, a county bounded by the river Thames, on the north; by the ocean, on the eaft; by Suffex, and the ftraits of Dover, on the fouth; and by Surrey on the weft.

KERMAN, the capital of the province of Kerman, or Carimania, in Perfia: eaft long. 56° 30′, north lat. 30′.

KERMES, according to the arrangement of Linnæus, is a fpecies of the coccus. See the article COCCUS.

The female of this fpecies, which is what we

we know by the name kermes in the ſhops, is, when full grown, of a roundiſh figure, and of a deep purpliſh blue colour, covered with a fine whitiſh or greyiſh duſt, like that on the ſurface of a ripe plum; in this ſtate it is not eaſy to diſtinguiſh its limbs, or indeed its natural form; its being diſtended by young at this period altering, and in a manner deſtroying, its figure. It adheres in this ſtate to the leaves and young ſhoots of the ilex, and is collected thence for the ſhops: before this period, it runs about on the branches, and has its form more regular. The male is a very ſmall fly, which would ſcarce be thought to belong to the ſame ſpecies, if it were not ſeen impregnating the females; its body is oblong, its head ſmall, its eyes little and black, and its wings whitiſh, and full of brown and ſomewhat rigid nerves. It is the female that is gathered for uſe.

Kermes, as brought to us, is a ſmall roundiſh body, of the bigneſs of a pea: when cut, it is found to be a mere membranaceous bag, containing a multitude of little diſtinct granules, which are ſoft and juicy. It is a very valuable commodity, and ſerves to two very great uſes; the dyers in ſcarlet finding it as valuable in their way, as the phyſicians in theirs. The kermes intended for the dyers is beſt kept whole, only deſtroying the principle of life in the eggs, by means of vinegar; but that intended for medicinal purpoſes, is more properly managed in another way: they are to be gathered when fully diſtended, and while yet perfectly covered with bloom, and are to be immediately put into a mortar, and bruiſed to pieces. After which they are to be ſet in a cool place for ſeven or eight hours, in which time their juice will be rendered much leſs tough and viſcuous than it was on the firſt bruiſing; after this, it is to be preſſed pretty ſtrongly, in order to get out the whole. The liquor thus drawn, is to be ſet by for ſome hours to ſettle; the clear juice is then to be decanted off, and an equal quantity of fine ſugar is to be added to it, with which it is to be boiled over a very gentle fire, to the conſiſtence of a ſyrup, which is called kermes-juice in the ſhops. It will keep a long time, and the confection of alkermes is generally made from it. See the article ALKERMES.

The kermes is in great eſteem as a reſtorative, and is ſaid to ſtrengthen the ſtomach, and aſſiſt digeſtion, at the ſame time that it invigorates and enlivens in an uncommon manner. It is alſo in great eſteem among the midwives, as a cordial and ſtrengthener for lying-in-women, and as a preventer of abortions.

The people who prepare kermes for the dyers, often let the eggs hatch as they lie in drying, and then ſprinkling them with vinegar, they kill them, and form them into a ſort of cakes, which keep very well a long time.

KERMES-MINERAL, *pulvis carthuſianorum*, in pharmacy, a preparation of antimony, made up in the following manner. Take of antimony, four pounds; ſolution of fixt nitre per deliquium, one pound; rain water, three pounds; boil them two hours, and then filter the boiling decoction through paper; let it ſtand at reſt twenty-four hours, and it will let fall a yellowiſh or ſaffron-coloured powder, the fluid becoming clear. This fluid being then poured off by inclination, the powder muſt be waſhed by repeated affuſions of warm water, and four ounces of ſpirit of wine being burnt upon it, afterwards kept for uſe.

This powder, according to Quincy, is a moſt efficacious deobſtruent, and therefore extremely uſeful in ſcrophulous, obſtinate, ſcorbutic, and all ſuch caſes as ariſe from glandular obſtruction, as likewiſe in chloretic, cachectic, and hyſterical habits, where the vitiated craſis of the blood has impaired the vis vitæ, and debilitated the ſecretive powers: it has been recommended alſo in fevers; but the uſe of medicines of this claſs, is not yet enough authorized by experience, to render ſuch a practice eligible.

The doſes given, have been from one grain to four; but it is beſt to begin firſt with the ſmalleſt doſe, eſpecially with young perſons, as the force of its operation varies greatly in different conſtitutions.

KERNING, among ſalt-makers, the cryſtallizing of ſalt. See the article SALT.

KERRY, a county of Ireland, in the province of Munſter, bounded by the river Shannon, which divides it from Clare, on the north; by Limeric and Cork, on the eaſt; by another part of Cork, on the ſouth; and by the Atlantic Ocean, on the weſt.

KESHITAH, in antiquity, the name of a jewiſh coin, otherwiſe called gerah. See the article COIN.

KESSEL, a town of Upper Gelderland, in the quarter of Roermonde, ſituated on the river Meuſe: eaſt long. 6°, north lat. 51° 25'.

KESTRIL, or KASTRIL, in ornithology, the

the yellow-legged falcon, with a brown back, a fpotted breaft, and a rounded tail, with a broad black fafcia, towards the end. It is a very beautiful bird, about the fize of a pigeon, and very bold. It is known among authors, by the names of tinnunculus and cenchris, and is alfo called in englifh, the ftannel or windhover. See plate CXLIX. fig. 5.

KESWICK, a market-town of Cumberland, twenty-five miles fouth weft of Carlifle.

KETCH, in naval architecture, a veffel with two mafts. See the article SHIP.

KETCH DOLT, a game with dice and tables, wherein the firft throws, and lays down from the heap of men without the tables, more or lefs, according to what he threw, fuppofe fice deuce; then if the other throw either fice or deuce, and draw them not from his adverfaries tables to the fame point in his own, but takes them from the heap, and lays the ace down, he is *dolted*; and fo loofeth the game: nay, if he but touch a man of the heap, and then recollect himfelf, the lofs is the fame. Good gamefters will never be *dolted*; in which cafe, they ftrive who fhall fill up their tables firft, and he that bears them off firft wins the game. See BACK-GAMMON.

KETTERING, a market-town of Northamptonfhire, ten miles north-eaft of Northampton.

KETTERINGSTONE, in the hiftory of foffils, the friable pfadurium, with a round gritt, being the fubftance fo much talked of in the world under this name, though it is an erroneous one, it not being found about Kettering in Northamptonfhire, but about Ketton, a fmall town in Rutland. See the article STONE.

It is a very remarkable and beautiful ftone, of a lax texture, and appears where broken of a cavernous or porous ftructure; but this is not really the cafe, the cavities feen there being not originally in the ftone, but made by falling out of the inner part of its gritt, which is ufually loofe, and falls out as foon as its containing fhell is broken. It is of a dufky brownifh white colour, and is compofed of a roundifh gritt laid very clofely together, and furrounded with a cementitious matter of a terrene fpar. It is not only found about Ketton, but in many other parts of the kingdom; and is ufed in many places in building. See the article PORTLAND STONE.

KETTLE, a well known mettaline veffel, for boiling any thing in.

KETTLE-DRUMS, in the art of war. See the article DRUM.

KETTON-STONE, the fame with Ketteringftone. See KETTERING-STONE.

KEVEL, in fhip-building, a piece of plank fayed againft the quickwork on the quarter-deck, in the fhape of a femicircle; about which the running rigging is belaid. See plate CXLIX. fig. 4.

KEXHOLME, the capital of the province of the fame name in Finland, fituated on the lake Ladoga, eighty miles north of Peterfburg: eaft long. 30°, north lat. 61° 30′.

KEY, *clavis*, a well known inftrument, for opening and fhutting the locks of doors, chefts, buroes, and the like. See the article LOCK.

The names of the feveral parts of a key are thefe: A (plate CXLIX. fig. 3.) is the pin-hole, drilled into the end of the fhank H; B is the ftep, or dap-ward; C, the hook-ward; D, the middle-ward; E E the crofs-ward; F, the main-ward; G G, crofs-wards; I, the pot; K, the bow-ward; L, the bow, or handle; and B F E D, *&c.* the piece of fteel containing the wards, is called the bit of the key.

Keys are prohibited to be imported.

KEY, in mufic, a certain fundamental note, or tone, to which the whole piece, be it in concerto, fonata, cantata, *&c.* is accommodated, and with which it ufually begins, but always ends. See CLEF.

To get an idea of the ufe of the key, it may be obferved, that as in an oration there is a fubject, *viz.* fome principal perfon or thing to which the difcourfe is referred, and which is always kept in view, that nothing unnatural or foreign to the fubject may be brought in, fo in every regular piece of mufic, there is one found, *viz.* the key, which regulates all the reft. Again, as in an oration there are feveral diftinct articles, which all refer to different fubjects, yet fo as they may have a vifible connection with the principal fubject, which regulates and influences the whole; fo in mufic, there may be various fubaltern fubjects, that is various keys, to which the different parts of the piece may belong: but then they muft be all under the influence of the firft and principal key, and have a fenfible connection with it.

Now to give a more diftinct notion of the key,

key, we muſt obſerve, that the octave contains in it the whole principles of muſic, both with reſpect to conſonance and melody; and that if the ſcale be continued to a double octave, there will in that caſe be ſeven different orders of the degrees of an octave, proceeding from the ſeven different letters, with which the terms of the ſcale are marked. Any given ſound therefore, *i. e.* a ſound of any determinate pitch of tune, may be made the key of the piece, by applying it to the ſeven natural notes ariſing from the diviſion of an octave, and repeating the octave above and below at pleaſure: the given note is applied as the principal note or key to the piece, by making frequent cloſes or cadences upon it; and in the progreſs of the melody, no other than theſe ſeven natural ſounds can be admitted, while the piece continues in that key.

Here too it muſt be added with reſpect to the two different diviſions of the octave, that a ſound may belong to the ſame key, that is, have a juſt muſical relation to the ſame fundamental in the one kind of diviſion, and be out of the key in reſpect of the other. Now a piece of muſic may be carried through ſeveral keys, that is, it may begin in one key, and be led out of that into another, by introducing ſome ſound foreign to the firſt, and ſo on to another: but a regular piece of muſic muſt not only return to the firſt key, but thoſe keys too muſt have a particular connection with the firſt. It may be added, that thoſe other keys muſt be ſome of the natural ſounds of the principal key, though not any of them at pleaſure.

From the diſtinction already obſerved, it is evident, that there are but two different ſpecies of keys, which ariſe according as we join the greater or leſſer third, theſe being always accompanied with the ſixth and ſeventh of the ſame ſpecies; the third greater, for inſtance, with the ſixth and ſeventh greater, and the third leſſer with the ſixth and ſeventh leſſer. And this diſtinction is expreſſed under the name of a ſharp key, which is that with the third greater, *&c.* and the flat key with the third leſſer, *&c.* whence it is plain, that how many different caſes ſoever there be in a piece, there can be but two keys, if we conſider the eſſential difference of keys; every key being either flat or ſharp, and every ſharp key being the ſame as to melody, as well as a flat one. See the articles MODULATION, and HARMONY.

To diſtinguiſh accurately between a mode and a key, Mr. Malcolm has given us this definition, *viz.* An octave with all its natural and eſſential degrees, is a mode with reſpect to the conſtitution or manner of dividing it: but with reſpect to its place in the ſcale of muſic, it is a key. See MODE and MELODY.

KEY, is alſo uſed for an index, or explanation of a cipher. See CIPHER.

KEYS *of an organ, harpſichord,* &c. thoſe little pieces in the forepart of thoſe inſtruments, by means whereof the jacks play, ſo as to ſtrike the ſtrings. Theſe are in number twenty-eight, or twenty-nine. In large organs, there are ſeveral ſets of the keys, ſome to play the ſecondary organ, ſome for the main body, ſome for the trumpet, and ſome for the echoing trumpet, *&c.* in ſome there are but a part that play, and the reſt are only for ornament. There are twenty ſlits in the large keys, which make half notes. See the article ORGAN, *&c.*

KEY-STONE of an arch, or vault, that placed at the top or vertex of an arch, to bind the two ſweeps together.

This, in the tuſcan and doric orders, is only a plain ſtone, projecting a little; in the ionic, it is cut and waved ſomewhat like conſoles; and, in the corinthian and compoſite orders, it is a conſole, enriched with ſculpture.

Key-ſtones made in the manner of conſoles, and placed projecting in the middle of arches and porticos, are particularly deſigned to ſuſtain the weight and preſſure of the entablature, where it happens to be very great between the columns; for which reaſon, they ſhould be made ſo as to be a real ſupport, and not ſtand for mere ornaments, as they too frequently do.

KIAM, a great river of China, which, taking its riſe near the weſt frontier, croſſes the whole kingdom eaſtward, and falls into the bay or gulph of Nanking, a little below that city.

KIAMSI, a province of China, bounded by that of Nanking on the north, and by that of Canton on the ſouth.

KIDDERMINSTER, a market-town twelve miles north of Worceſter.

KIDNEYS, *renes*, in anatomy, are two red viſcera of an oblong figure, ſituated at the loins, one on each ſide; their hollow ſide being turned inward, and their convex ſide outward. They are placed near the

the loweſt ſpurious ribs; but their ſituation is not exactly regular; for in ſome ſubjects they are a little higher, and in others a little lower; and one of them is not unfrequently placed a little above the other: it is not always the ſame kidney that is placed higheſt; but ſometimes the right, and ſometimes the left; however, they are ſometimes perfectly even.

The kidneys are connected with the loins, the lower ribs, the colon, the ſuccenturiati, the renal veſſels, and the ureters. They have two membranes, the one robuſt and common, called the adipoſe membrane: this ſurrounds them but looſely, and is furniſhed with its own proper veſſels. The other membrane is proper, and is very thin, and every where applied cloſely to the ſubſtance of the kidneys.

The length of the kidneys is five or ſix fingers, the breadth three, and the thickneſs about a finger and a half. Its ſurface, in adults, is ſmooth and equal; but in the fœtus in human ſubjects, and in grown animals of many kinds, it is irregularly divided, as it were, into a number of lobes.

The veſſels of the kidneys, are, like thoſe of the liver, included in a membrane, from the peritonæum. The arteries and veins are large, and called emulgents, and venal veſſels; theſe are produced from the aorta and vena cava. The nerves are from the plexus renalis; and there is a large excretory duct, called the ureter. There are alſo a number of lymphatics, paſſing to the receptaculum chyli. The ſubſtance of the kidneys is firm and hard, and is of two kinds. 1. The exterior, or cortical, which, according to Malpighi, is glandulous; but according to the diſcoveries of Ruyſch, is throughout elegantly vaſculous. 2. The interior, which is tubulous, and expreſſed by the name of tubuli urinarii Bellini: this terminates in ten or twelve papillæ, which open by a multitude of apertures into the pelvis; but theſe papillæ are not found in all ſubjects.

The uſe of the kidneys is to ſecrete the urine from the blood, into the pelvis. See the articles PELVIS, SUCCENTURIATI, URETERS, BLADDER, and URETHRA.

In plate CL, fig. 1. are repreſented the kidneys, glandulæ ſuccenturiatæ, bladder, and male organs of generation, with their veſſels. A, A, are the kidneys; B, B, the glandulæ ſuccenturiatæ; C, C, the emulgent veſſels, together with thoſe diſtributed over the membranes of the kidneys; D, D, the hypogaſtric veſſels, which branching off from the iliacs, are diſtributed in the urinary bladder and penis; E, E, the courſe of the ureters; F, F, the courſe of the ſpermatic veſſels, in which ſeveral appear cut off, being thoſe diſtributed in the peritonæum; G, the urinary bladder; H, H, the vaſa deferentia; I, I, the teſticles; K, the urachus cut off; L, the penis; M, M, the erector-muſcles.

Inflammation of the KIDNEYS. See the article NEPHRITIS.

KIDWELLY, a market-town of Caermarthen, in South Wales; ſituated on the Briſtol-channel, ſeven miles ſouth of Caermarthen.

KIEL, a city of the dutchy of Holſtein, in Germany, ſituated on a bay of the Baltic ſea, fifty miles north of Hamburg, eaſt long. 10°, north lat. 54° 32′.

KIGGELARIA, in botany, a genus of the dioecia decandria claſs of plants, in which the corolla of both the male and female flower conſiſt of five lanceolated, hollow petals; and its fruit is a coriaceous globoſe and unilocular capſule, containing a number of roundiſh ſeeds.

KILDARE, the capital of a county of the ſame name, in Ireland, twenty-ſeven miles ſouth-weſt of Dublin.

KILDERKIN, a liquid meaſure, containing two firkins. See the articles FIRKIN and MEASURE.

KILGARREN, a market-town of Pembrokeſhire, in South Wales; ſituated twenty-five miles north of Pembroke.

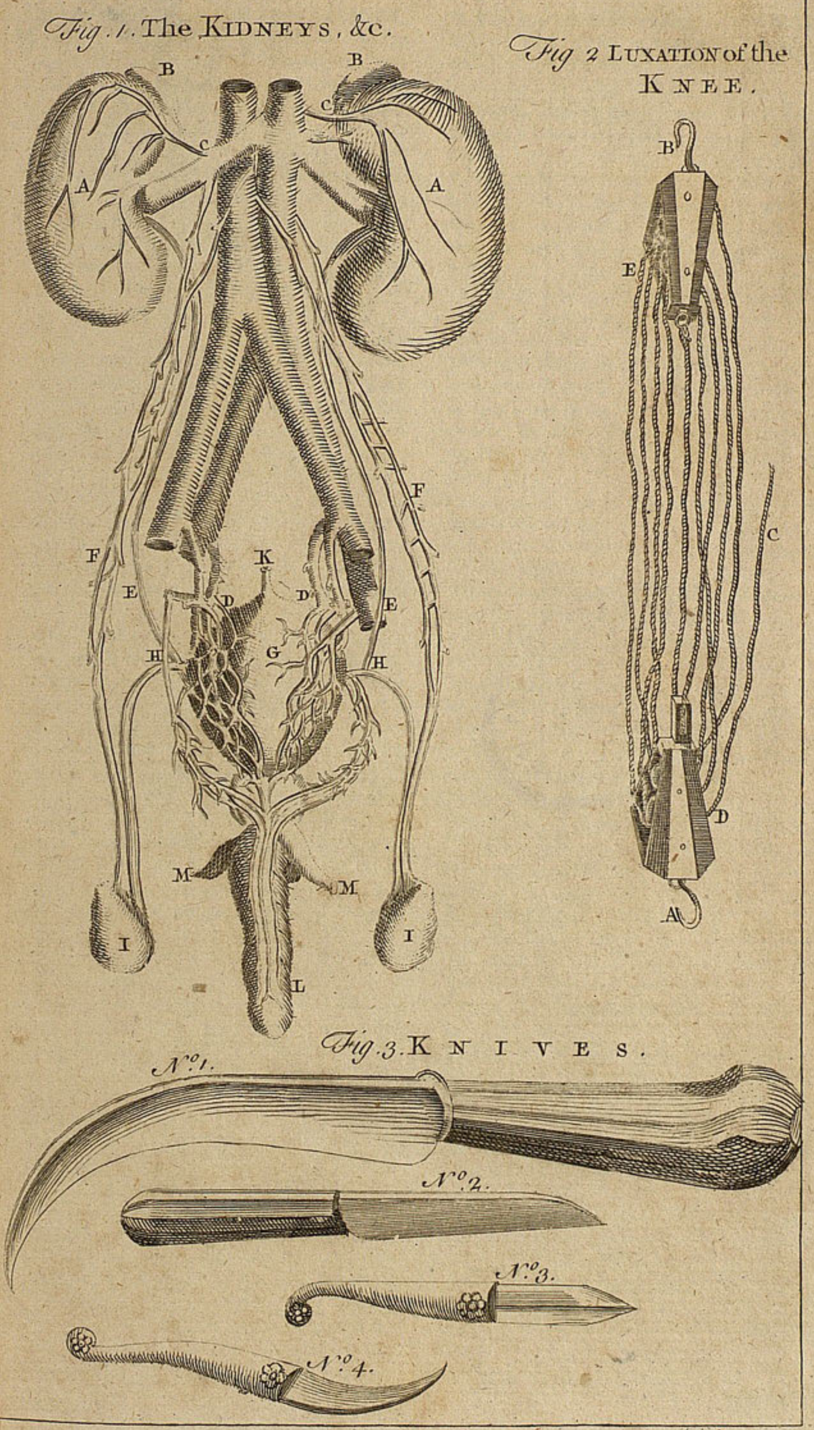
KILHAM, a market-town of the eaſt-riding of Yorkſhire, thirty miles north-eaſt of York.

KILKENNY, a county of Ireland, in the province of Leinſter, bounded by Queen's County, on the north; by the county of Wexford, on the eaſt; by Waterford, on the ſouth; and by the county of Tipperary, on the weſt. It is alſo the name of the capital of that county, and is ſituated in weſt long. 7° 15′, north lat. 52° 30′.

KIMBOLTON, a market-town of Huntingtonſhire, nine miles ſouth-weſt of Huntington.

KINDRED, in law, perſons related to another, whereof the law of England reckons three degrees or lines, *viz.* the deſcending, aſcending, and collateral line. See LINE, DEGREE, DIRECT, &c.

On there being no kindred in the deſcending line, the inheritance paſſes to the



J. Jefferys sculp.


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the collateral one. See INHERITANCE.

KING, in the general acceptation of the word, is a perfon who has a fupreme authority, with the power of levying taxes, making laws, and enforcing an obedience to them: but in England, which is a limited monarchy, the power of the king is greatly reftrained; which is fo far from diminifhing his honour, that it adds a glory to his crown; for while other kings are abfolute monarchs over innumerable multitudes of flaves, the king of England has the diftinguifhed glory of governing a free people, the leaft of whom is protected by the laws: he has great prerogatives, and a boundlefs power in doing good; and is at the fame time only reftrained from acting inconfiftently with his own happinefs, and that of his people. He has all the enfigns of royalty, and all the marks of fovereignty: but while he has the power of making treaties, of fending and receiving ambaffadors, of conferring titles of honour, creating privy counfellors, officers of ftate, and judges, and may raife men and arms both for fea and land, he cannot force his fubjects to maintain them, or raife one tax by his fole authority: he has the privilege of coining money, but he cannot force the meaneft fubject to part with his property: he can pardon a criminal, but he cannot put a fubject to death, till he is condemned by his peers: he may at his pleafure call, continue, prorogue, and diffolve parliaments, and without his royal affent no bill in parliament can pafs into a law; yet he can neither act contrary to law, nor make new laws by his fole authority; on the contrary, he may even be fued and caft in his own courts. At his coronation, he takes an oath to govern his people according to the ftatutes agreed on in parliament, to caufe law and juftice in mercy to be executed in all his judgments; to maintain, as much as in him lies, the laws of God, the true profeffion of the Gofpel, and the proteftant reformed religion by law eftablifhed, and to preferve to the bifhops and clergy all their rights and privileges. But tho' he may mitigate the rigour of the law, and forgive offenders, he cannot pardon murder, where an appeal is brought by the fubject; nor any other crime, when the offender is impeached by the houfe of commons. He may lay an embargo on fhipping, but then it ought to be for the public good, and not for the private advantage of any particular traders. Writs, proceffes, commiffions, *&c.* are in his name; and he has a power not only to make courts, but to create univerfities, colleges, and boroughs, to incorporate a city or town, and to grant franchifes to fuch corporations; but they muft not, under colour thereof, fet up a monopoly. He is efteemed the head of the church; in him is lodged the fupreme right of patronage throughout England, and he may be the founder as well as patron of bifhoprics. But notwithftanding thefe and other prerogatives, the king can take what he has a right to, only by due courfe of law. In fhort, he has a principal fhare in the legiflative power, and the whole executive power is lodged in him; he is fuppofed prefent in all his courts, he can do no wrong, and, according to the laws of England, he never dies.

KING *at arms*, or *of arms*, an officer who directs the heralds, prefides at their chapters, and has the jurifdiction of armory. See the articles HERALD and ARMS.

There are three kings of arms in England, namely, garter, clarencieux, and norroy.

Garter principal KING *at arms*. He, among other privileges, marfhals the folemnities at the funerals of the prime nobility, and carries the garter to kings and princes beyond fea, being joined in commiffion with fome peer of the kingdom. See the article GARTER.

Clarencieux KING *at arms*, fo called from the duke of Clarence to whom he firft belonged. He marfhals the funerals of baronets, knights, efquires, and gentlemen on the fouth-fide of the Trent. See the article CLARENCIEUX.

Norroy KING *at arms*, does the fame on the north fide of Trent; and thefe two laft are called provincial heralds, as dividing the kingdom between them into two provinces.

Thefe, by charter, have power to fet down noblemens pedigrees, diftinguifh their arms, appoint perfons their arms, and, with garter, direct the other heralds. Latterly the earl marfhal of England, by fpecial commiffion, to perfonate the king, creates the kings at arms.

Lyon KING *at arms*, for Scotland, is the fecond king at arms for Great-Britain; he is invefted and folemnly crowned. He publifhes the king's proclamations, marfhals funerals, reverfes arms, appoints meffengers at arms, *&c.* See the article COLLEGE *of Heralds*.

KING *of the Romans*. See ROMAN.

KING'S

KING'S BENCH, a court in which the king was formerly accuftomed to fit in perfon, and on that account was moved with the king's houfhold. This was originally the only court in Weftminfter-hall, and from this it is thought that the courts of common pleas and exchequer were derived. As the king in perfon is ftill prefumed in law to fit in this court, though only reprefented by his judges, it is faid to have fupreme authority, and the proceedings in it are fuppofed to be coram nobis, that is, before the king. This court confifts of a lord chief juftice and three other juftices or judges, who are invefted with a fovereign jurifdiction over all matters, whether of a criminal or public nature. All crimes againft the public good, though they do not injure any particular perfon, are under the cognizance of this court; and no private fubject can fuffer any unlawful violence or injury againft his perfon, liberty, or poffeffions, but a proper remedy is afforded him here; not only for fatisfaction of damages fuftained, but for the punifhment of the offender: and wherever this court meets with an offence contrary to the firft principles of juftice, it may punifh it. It frequently proceeds on indictments found before other courts, and removed by certiorari into this. Perfons illegally committed to prifon, though by the king and council, or either of the houfes of parliament, may be bailed in it; and in fome cafes, even upon legal commitments. Writs of mandamus are iffued by this court, for the reftoring of officers in corporations, &c. unjuftly turned out, and freemen wrongfully disfranchifed.

The court of king's bench is now divided into a crown fide and plea-fide; the one determining criminal, and the other civil caufes: in the firft it determines criminal matters of all kinds, where the king is plaintiff; fuch as treafons, felonies, murders, rapes, robberies, riots, breaches of the peace, and all other caufes that are profecuted by indictment, information, &c. On the plea-fide, it determines all perfonal actions commenced by bill or writ; as actions of debt, upon the cafe, detinue, trover, ejectment, trefpafs, wafte, &c. againft any perfon in the cuftody of the marfhal of the court, as every perfon fued here is fuppofed to be by law.

The officers of this court on the crown-fide are the clerk and fecondary of the crown; and on the fide of the pleas there are two chief clerks or prothonotaries, and their fecondary and deputy, the cuftos brevium, two clerks of the papers, the clerk of the declarations, the figner and fealer of bills, the clerk of the rules; clerk of the errors, and clerk of the bails; to which may be added the filazers, the marfhal of the court, and the cryer.

Books of KINGS, two canonical books of the Old Teftament, fo called becaufe they contain the hiftory of the kings of Ifrael and Judah, from the beginning of the reign of Solomon, down to the babylonifh captivity, for the fpace of near fix hundred years. The firft book of Kings contains the latter part of the life of David, and his death; the flourifhing ftate of the Ifraelites under Solomon, his building and dedicating the temple of Jerufalem, his fhameful defection from the true religion, and the fudden decay of the jewifh nation after his death, when it was divided into two kingdoms: the reft of the book is taken up in relating the acts of four kings of Judah and eight of Ifrael. The fecond book, which is a continuation of the fame hiftory, is a relation of the memorable acts of fixteen kings of Judah, and twelve of Ifrael, and the end of both kingdoms, by the carrying of the ten tribes captive into Affyria by Salmanaffar, and the other two into Babylon by Nebuchadnezzar.

It is probable that thefe books were compofed by Ezra, who extracted them out of the public records, which were kept of what paffed in that nation.

KING'S COUNTY, a county of Ireland, in the province of Leinfter, bounded by Weft-meath on the north, by the county of Kildare on the eaft, by Queen's county and Tipperary on the fouth, and by the river Shannon, which feparates it from Galway, on the weft.

KING'S EVIL, *fcrophula*, in medicine. See the article SCROPHULA.

KING-FISHER, *ifpida*, in ornithology. See the article ISPIDA.

KING'S SILVER, the money due to the king in the court of common-pleas, *pro licentia concordandi*, in refpect of a licence there granted to any man, for levying a fine of lands or tenements to another perfon. See the article FINE.

KINGDOM, among chemifts and writers of natural hiftory, a term which they apply to each of the three orders or claffes of natural bodies: animal, vegetable, and mineral. See the articles BODY, ANIMAL, VEGETABLE and FOSSIL.

KINGHORN, a town of Scotland, on the coaſt of Fife, nine miles north of Edinburgh.

KINGSTON, a market-town of Surry, ſituated on the river Thames, twelve miles weſt of London.

KINGSTON, a port-town of Jamaica, ſituated on the north ſide of the bay of Port-royal: weſt long. 77°, north lat. 17° 32′.

KINGSTON *upon Hull.* See HULL.

KINROSS, a town of Scotland, in the ſhire of Fife, ſituated on the lake of Loch-Leven, twenty miles north of Edinburgh.

KINSALE, a port-town of Ireland, in the county of Cork and province of Munſter, ſituated on the river Bandon, fourteen miles ſouth of the city of Cork: weſt long. 8° 20′, and north lat. 51° 32′.

KIOF, or KIOW, the capital of the ruſſian Ukraine, on the frontiers of Poland: eaſt long. 30° 30′, and north lat. 51°.

KIPHONISM, or KYPHONISM. See the article KYPHONISM.

KIRK, a ſaxon term, ſignifying the ſame with church. See the article CHURCH.

KIRK-MOTE, a term formerly uſed for a ſynod. See the article SYNOD.

KIRK-OSWALD, a market-town of Cumberland, twelve miles ſouth of Carliſle.

KIRK-SESSIONS, an inferior church-judicatory, in Scotland, conſiſting of the miniſters, elders, and deacons of a pariſh. It regulates matters relating to public worſhip, catechiſing, viſitations, &c. and judges in caſes of fornication and leſſer ſcandals; but adultery, and the like, are left to the preſbytery. See the article PRESBYTERIANS.

KIRKALDY, a town of Fifeſhire, in Scotland, ten miles north of Edinburgh.

KIRKHAM, a market-town of Lancaſhire, ſixteen miles ſouth of Lancaſter.

KIRKUDBRIGHT, a parliament town of Scotland, which ranks with Dumfries, Annan, &c. ſituated on a bay of the Iriſh ſea, ſixty miles weſt of Carliſle: weſt long. 4° 5′, and north lat. 54° 38′.

KIRKWALL, the capital of the Orkney-iſlands, and ſituated in that of Pomona, is a parliament-town, which claſſes with Dingwall, Tain, &c. weſt long. 25′, and north lat. 59° 45′.

KITCHEN, a room appropriated for dreſſing meat, and furniſhed with ſuitable accommodations and utenſils for that purpoſe.

Clerk of the KITCHEN, an officer of the king's houſhold, whoſe office is to buy proviſions.

KITCHEN-GARDEN, a piece of ground laid out for the cultivation of fruit, herbs, pulſe, and other vegetables uſed in the kitchen.

A kitchen-garden ought to be ſituated on one ſide of the houſe, near the ſtables, from whence the dung may be eaſily conveyed into it; and after having built the wall, borders ſhould be made under them, which, according to Miller, ought to be eight or ten feet broad: upon thoſe borders expoſed to the ſouth, many ſorts of early plants may be ſown; and upon thoſe expoſed to the north, you may have ſome late crops, taking care not to plant any ſort of deep-rooting plants, eſpecially beans and peas, too near the fruit-trees. You ſhould next proceed to divide the ground into quarters; the beſt figures for theſe is a ſquare, or an oblong if the ground will admit of it; otherwiſe they may be of that ſhape which will be moſt advantageous to the ground: the ſize of theſe quarters ſhould be proportioned to that of the garden; if they are too ſmall, your ground will be loſt in walks, and the quarters being encloſed by eſpaliers of fruit-trees, the plants will draw up ſlender, for want of a more open expoſure. The walks ſhould alſo be proportioned to the ſize of the ground; theſe in a ſmall garden ſhould be ſix feet broad, but in a larger one ten; and on each ſide of the walk there ſhould be allowed a border three or four feet wide, between it and the eſpalier; and in theſe borders may be ſown ſome ſmall ſallads, or any other herbs that do not take deep root, or continue long: but theſe quarters ſhould not be ſown or planted with the ſame crops two years together. In one of theſe quarters, ſituated neareſt to the ſtables, and beſt defended from the cold winds, ſhould be the hot-beds, for early cucumbers, melons, &c. and to theſe there ſhould be a paſſage from the ſtables, and a gate through which a ſmall cart may enter. The moſt important points of general culture conſiſt in well digging and manuring the ſoil, giving a proper diſtance to each plant, according to their different growths, as alſo in keeping them clear from weeds; for this purpoſe you ſhould always obſerve to keep your dung-hills clear from them; if this is not done, their ſeeds will be conſtantly brought in, and ſpread with the dung.

KITE, *milvus.* See MILVUS.

KLEINIA, or CACALIA, in botany, a genus of the ſyngeneſia-polygamia claſs of plants, the compound flower of which is

is uniform, confifting of about twenty monopetalous infundibuliform flofcules, quinquedented at the limb; the ftamina are five very fhort filaments; and the feed is fingle, and crowned with a fimple downy filament.

KNAPWEED Jacea, in botany, a fpecies of centaurea. See Centaurea.

KNARESBOROUGH, a borough-town in the north riding of Yorkfhire, fifteen miles north of York.

It fends two members to parliament.

KNAVE, in old law-books, an appellation given to a man fervant, or even to a male child.

KNAUTIA, in botany, a genus of the tetrandria-monogynia clafs of plants, the compound flower of which is equal, whereas the proper corolla is unequal, monopetalous, and quadrifid at the limb, with a tube of the length of the cup: the feeds are fingle, or one for each proper corolla, and tetragonal; they are hairy at the top, and contained in a common receptacle.

KNEE, *genu*, in anatomy, the articulation of the thigh and leg-bones. See the articles Femur, Tibia, Patella, *&c.*

The two principal motions of this joint are flexion and extenfion: in the former of thefe the leg may be brought to a very acute angle with the thigh, by the condyles of the thigh-bone being round and fmoothed fo far backwards; and in performing this, the patella is pulled down by the tibia. When the leg is to be extended, the patella is drawn upwards, and the tibia forwards, by the extenfor-mufcles, which, by means of the protuberant joint, and this thick bone with its ligament, have the chord with which they act, at a confiderable angle, and therefore act with advantage: but, in order that the body may be fupported by a firm perpendicular column, they are reftrained by the pofterior crofs-ligament, from pulling the leg farther than to a ftraight line with the thigh; and when this is done, the thigh and leg are almoft as immoveable as if they were one continued bone: but when the joint is a little bent, the pofterior ligament is relaxed, and the patella not tightly braced; therefore the fuperficial cavities of the tibia will allow this bone to be moved a little to either fide, or with a fmall rotation; which is done by the motion of the external cavity backwards and forwards on the internal, which ferves as a kind of axis. The rotation of the leg outwards, is of great advantage to us, in croffing our legs on feveral neceffary occafions; though it is wifely ordered by providence, that this motion fhould not be very great, fince this would have occafioned frequent luxations. While all thefe motions are performing, the only part of the tibia that moves immediately on the condyles, is only fo much as is within the cartilaginous rings, which by the thicknefs of their outfides, make the cavities of the tibia more horizontal, by raifing their external fide, where the furface of the tibia flants downwards; by which means the motions of this joint are more equal and fteady than they would otherwife have been. The cartilages are fitted to do this good office in the different motions and poftures of the member, by being capable of changing a little their fituation; and this alfo contributes to make the motions larger and quicker.

Luxation of the Knee, in furgery, is the receding of the tibia from under the lower extremity of the thigh-bone; which happens fometimes on the outfide, fometimes on the infide, and fometimes backwards, but very rarely or never forwards, by reafon the patella prevents it.

When the knee is but flightly luxated, the patient is to be feated on a bed, bench, or table, and one affiftant is to hold the thigh firm above the knee, and the other to extend the leg, while the furgeon in the mean time replaces the bones by his hand and knee: but when this method is not fufficient, furgeons make ufe of flings, pulleys, and other inftruments. See plate CL. fig. 2. which reprefents a polyfpafton, or compound pulley, A and B being two hooks, by which the inftrument is faftened on both fides; C, the rope, by drawing which an extenfion is made in the luxated limb; and D and E, the two pullies, confifting of feveral wheels, whereby the force of the drawer is greatly increafed. See the article Pully.

They ought, however, to be here very careful, left they make the extenfion fo violent in children and young people, as to feparate the epiphyfes from the bones, to which they are not yet firmly united, for by that means a worfe diforder and lamenefs will be brought on. After the luxation of the knee is rightly reduced, it is to be properly bound up, and placed in a ftraw-cafe; and the reft muft be managed as in the luxation of the patella. See the article Patella.

Knee, in a fhip, a crooked piece of timber, bent like a knee, ufed to bind the

beams and futtocks together, by being bolted faſt into them both. Theſe are uſed about all the decks.

Carling-Knees, in a ſhip, thoſe timbers which extend from the ſides to the hatchway, and bear up the deck on both ſides.

KNIFE, a well known inſtrument, made for cutting.

Surgeons have ſeveral kinds of knives; ſome for dividing the fleſh to the bone, in the upper and lower extremities; theſe are commonly falciform, or hooked, as repreſented in plate CL. fig. 3. n° 1. though Heiſter, in moſt caſes, prefers the ſmall ſtraight knife, *ibid.* n° 2. Other inciſion-knives are double-edged, like that repreſented *ibid.* n° 3. and, finally, there are other leſſer falciform inciſion-knives, for cutting away excreſcences, which the others cannot conveniently reach. All ſorts of knives are prohibited to be imported.

KNIGHT, *eques*, among the Romans, a perſon of the ſecond degree of nobility, following immediately that of the ſenators. See Equestrian Order.

Part of the ceremony whereby this honour was conferred, was the giving of an horſe; for each had an horſe at the public charge, and received the ſtipend of a horſeman, to ſerve in the wars.

When the knights were taken in among the ſenators, they reſigned the privilege of having an horſe kept for them at the charge of the public: then it became neceſſary, in order to be a knight, that they ſhould have a certain revenue, that their poverty might not diſgrace the order; and when they failed of the preſcribed revenue, they were expunged out of the liſt of knights, and thruſt down among the plebeians. Ten thouſand crowns is computed to have been the revenue required.

The knights at length grew ſo very powerful, that they became a balance between the power of the ſenate and people: they neglected the exerciſes of war, and betook themſelves principally to civil employments in Rome.

Knight, in a more modern ſenſe, properly ſignifies a perſon, who, for his virtue and martial proweſs, is by the king raiſed above the rank of gentlemen, into an higher claſs of dignity and honour.

Knighthood was formerly the firſt degree of honour in the army, and uſually conferred with a great deal of ceremony, on thoſe who had diſtinguiſhed themſelves by ſome notable exploit in arms: the ceremonies at their creation have been various; the principal was a box on the ear, and a ſtroke with a ſword on the ſhoulder; they put on him a ſhoulder-belt, and a gilt ſword, ſpurs, and other military accoutrements; after which being armed as a knight, he was led to the church in great pomp. Camden deſcribes the manner of making a knight-batchelor among us, which is the loweſt, though the moſt antient order of knighthood, to be thus: the perſon kneeling, was gently ſtruck on the ſhoulder by the prince, and accoſted in theſe words, "Riſe, or be a knight, "in the name of God." For the ſeveral kinds of knights among us, ſee the articles Batchelor, Banneret, Baronet, Bath, Garter, &c.

Knight is alſo underſtood of a perſon admitted into any order, either purely military, or military and religious, inſtituted by ſome king or prince, with certain marks and tokens of honour and diſtinction, as the knights of the garter, knights of the thiſtle, knights of Malta, the knights of the Holy Ghoſt, &c. all which may be ſeen under their ſeveral heads.

Knights-errant, a pretended order of chivalry, much talked of in old romances, being a kind of heroes that travelled the world in ſearch of adventures, redreſſing wrongs, reſcuing damſels, and taking all occaſions of ſignalizing their proweſs. Of this kind of knights was Don Quixote, the hero of a celebrated romance, known by that name. This romatic bravery of the old knights was heretofore the chimera of the Spaniards.

Knights *of the ſhire*, or Knights *of parliament*, in the britiſh polity, are two knights or gentlemen of eſtate, who are elected, on the king's writ, by the freeholders of every county, to repreſent them in parliament.

The qualifications of a knight of the ſhire, is to be poſſeſſed of 600 l. *per an.* in a freehold eſtate. Their expences during their ſitting, were, by a ſtatute of Hen. VIII. to be defrayed by the county; but this is now ſcarce ever required.

Knight-marshal, an officer in the king's houſhold, who has juriſdiction and cognizance of any tranſgreſſion within the king's houſhold and verge; as alſo of contracts made there, whereof one of the houſe is party.

Knights, in a ſhip, two thick ſhort pieces of wood, commonly carved like a man's head, having four ſhivers in each, three for the halyards, and one for the topropes to run in; one of them ſtands faſt bolted

bolted on the beams abaft the foremaſt, and is therefore called the fore-knight; and the other, ſtanding abaft the main-maſt, is called the main knight.

KNOT, a part of a tree, from which ſhoots out branches, roots, or even fruit. The uſe of the knots of plants, is to ſtrengthen the ſtem: they ſerve alſo as ſearces, to filtrate, purify, and refine the juices raiſed up for the nouriſhment of the plant.

KNOTS *of a rope*, among ſeamen, are diſtinguiſhed into three kinds, *viz.* whole-knot, that made ſo with the lays of a rope that it cannot ſlip, ſerving for ſheets, tacks, and ſtoppers: bow-link knot, that ſo firmly made, and faſtened to the cringles of the ſails, that they muſt break or the ſail ſplit before it ſlips: and ſheep-ſhank-knot, that made by ſhortening a rope without cutting it, which may be preſently looſened, and the rope not the worſe for it.

KNOT *of the log line*, at ſea, are the diviſions of it. See the article LOG.

KNOWLEDGE, is defined, by Mr Locke, to be the perception of the connection and agreement, or diſagreement and repugnancy, of our ideas. See IDEA.

In the introduction to this work, we have given a general diſtribution of knowledge, according to its objects; and ſhall here conſider it with regard to its foundation, degrees, extent, reality, and manner of improvement.

Foundation and degrees of KNOWLEDGE. There are ſeveral ways wherein the mind becomes poſſeſſed of truth, each of which is called knowledge.

1. There is actual knowledge, when the mind has a preſent view of the agreement or diſagreement of any of its ideas, or of the relations they have one with another. This is called intuitive knowledge; and whatever is deduced from our intuitive perceptions, by a clear and connected ſeries of proofs, is ſaid to be demonſtrated, and produces abſolute certainty in the mind: and hence the knowledge, obtained in this manner, is called ſcience, becauſe, in each ſtep of the procedure, it carries its own evidence along with it, and leaves no room for doubt or heſitation. And what is highly worthy of notice, as the truths of this claſs expreſs the relations between our ideas, and the ſame relations muſt ever and invariably ſubſiſt between the ſame ideas, our deductions in the way of ſcience, conſtitute what we call eternal, neceſſary, and immutable truths. If it be true that the whole is equal to all its parts, it muſt be ſo unchangeably; becauſe the relation of equality being attached to the ideas themſelves, muſt ever intervene where the ſame ideas are compared. Of this nature are all the truths of natural religion, morality and mathematics, and in general, whatever may be gathered from the bare view and conſideration of our ideas. See INTUITION and DEMONSTRATION.

2. Another ground of human knowledge is experience; from which we infer the exiſtence of thoſe objects that ſurround us, and fall under the immediate notice of our ſenſes. When we ſee the ſun, or caſt our eyes towards a building, we not only have ideas of thoſe objects within ourſelves, but aſcribe to them a real exiſtence out of the mind. It is alſo by the information of the ſenſes, that we judge of the qualities of bodies; as when we ſay that ſnow is white, fire hot, or ſteel hard. For as we are wholly unacquainted with the internal ſtructure and conſtitution of the bodies that produce theſe ſenſations in us, nay, and are unable to trace any connection between that ſtructure and the ſenſations themſelves, it is evident, that we build our judgments altogether upon obſervation, aſcribing to bodies ſuch qualities as are anſwerable to the perceptions they excite in us. But this is not the only advantage derived from experience, for to that too we are indebted for all our knowledge regarding the co-exiſtence of ſenſible qualities in objects, and the operations of bodies one upon another. Ivory, for inſtance, is hard and elaſtic; this we know by experience, and, indeed, by that alone: for being altogether ſtrangers to the true natue both of elaſticity and hardneſs, we cannot, by the bare contemplation of our ideas, determine how far the one neceſſarily implies the other, or whether there may not be a repugnance between them: but when we obſerve them to exiſt both in the ſame object, we are then aſſured, from experience, that they are not incompatible; and when we alſo find that a ſtone is hard and not elaſtic, and that air, though elaſtic, is not hard, we alſo conclude, upon the ſame foundation, that theſe ideas are not neceſſarily conjoined, but may exiſt ſeparately in different objects. In like manner, with regard to the operations of bodies one upon another, it is evident, that our knowledge this way is all derived from obſervation. Aqua-regia

diſſolves gold, as has been found by frequent trial, nor is there any other way of arriving at the diſcovery. Naturaliſts may tell us, if they pleaſe, that the parts of aqua-regia are of a texture apt to inſinuate between the corpuſcles of gold, and thereby looſen and ſhake them aſunder. If this be a true account of the matter, I believe it will, notwithſtanding, be allowed, that our conjecture in regard to the conformation of theſe bodies, is deduced from the experiment, and not the experiment from the conjecture. To this head we may likewiſe refer whatever knowledge ariſes from teſtimony. See the article EXPERIMENTAL PHILOSOPHY.

3. A third foundation of knowledge is memory: when a man, having once evidently perceived certain truths, he ever afterwards readily aſſents to them whenever they come to be reflected on. This may be called habitual knowledge, whereby a man may be ſaid to know all thoſe truths which are lodged in his memory, by a former, clear and full perception; and is of two ſorts: the one is of ſuch truths laid up in the memory, as whenever they occur to the mind, it actually perceives the relation there is between thoſe ideas; and this is in all thoſe truths where the ideas themſelves, by an immediate view, diſcover their agreement or diſagreement one with another. The other is of ſuch truths, of which the mind having been convinced, it retains the memory of the conviction without the proofs. Thus a man that remembers certainly, that he once perceived the demonſtration that the three angles of a triangle are equal to two right ones, knows it to be true when that demonſtration is gone out of his mind, and poſſibly cannot be recollected; but he knows it in a different way from what he did before; namely, not by the intervention of thoſe intermediate ideas whereby the agreement or diſagreement of thoſe in the propoſition was at firſt perceived; but by remembring, that is knowing, that he was once certain of the truth of this propoſition, that the three angles of a triangle are equal to two right ones. The immutability of the ſame relations between the ſame immutable things, is now the idea that ſhews him, that if the three angles of a triangle were once equal to two right ones, they will always be ſo. And hence he comes to be certain, that what was once true is always true; what ideas once agreed will always agree; and conſequently, what he once knew to be true, he will always know to be true as long as he can remember that he once knew it.

Extent and limits of human KNOWLEDGE. 1. It is evident that we can have no knowledge farther than we have perception of the agreement or diſagreement of our ideas, whether by intuition, demonſtration, or ſenſation. 2. We cannot have an intuitive knowledge that ſhall extend itſelf to all our ideas and all that we know about them, becauſe we cannot examine and perceive all the relations they have to each other; thus we cannot intuitively perceive the equality of two extenſions, the difference of whoſe figures makes their parts incapable of an exact immediate application. 3. Demonſtrative knowledge cannot reach to the whole extent of our ideas, becauſe we cannot always find ſuch proofs as will connect them together, with an intuitive knowledge in all the parts of the deduction. Thus, though we have the ideas of a ſquare, a circle, and equality, yet we, perhaps, ſhall never be able to find a ſquare exactly equal to a circle. The affirmations, or negations we make concerning the ideas we have, being reduced by Mr. Locke to theſe four, *viz.* identity, co-exiſtence, relation and real exiſtence, he examines how far our knowledge extends to each of theſe.

1. As to identity and diverſity, our intuitive knowledge is ſo far extended as our ideas themſelves, and there can be no idea in the mind which it does not preſently, by an intuitive knowledge, perceive to be what it is, and to be different from any other.

2. As to the agreement or diſagreement of our ideas of coexiſtence, our knowledge herein is very defective, though the greateſt and moſt material part of our knowledge concerning ſubſtances conſiſts in it. As to the powers of ſubſtances, which makes a great part of our enquiries about them, our knowledge reaches little further than experience, becauſe they conſiſt in a texture and motion of parts which we cannot by any means come to diſcover.

3. As to the third ſort, the agreement or diſagreement of our ideas in any other relation; this is the largeſt field of knowledge, and it is hard to determine how far it may extend. This part depending on our ſagacity in finding intermediate ideas, that may ſhew the habitudes

tudes and relations of ideas, it is difficult to tell when we are at an end in fuch difcoveries.

4. As to the fourth part of knowledge, *viz.* of the real actual exiftence of things, we have an intuitive knowledge of our own exiftence, a demonftrative knowledge of the exiftence of God, and a fenfitive knowledge of the objects that prefent themfelves to our fenfes. See the article EXISTENCE.

Reality of human KNOWLEDGE. It is evident, fays Mr. Locke, that the mind knows not things immediately, but by the intervention of the ideas it has of them. Our knowledge therefore is real only fo far as there is a conformity between our ideas and the reality of things. But how fhall we know when our ideas agree with things themfelves? It is anfwered, there are two forts of ideas that we may be affured agree with things: thefe are,

1. Simple ideas; which, fince the mind can by no means make to itfelf, muft be the effect upon things operating upon the mind in a natural way, and producing therein thofe perceptions which, by the will of our maker, they are ordained and adapted to. Hence it follows, that fimple ideas are not fictions of our fancies, but the natural and regular productions of things without us really operating upon us, which carry with them all the conformity our ftate requires, which is to reprefent things under thofe appearances they are fitted to produce in us. Thus the idea of whitenefs, as it is in the mind, exactly anfwers to that power which is in any body to produce it there. And this conformity between our fimple ideas and the exiftence of things, is fufficient for real knowledge. See the article IDEA.

2. All our complex ideas, except only thofe of fubftances, being archetypes of the mind's own making, and not referred to the exiftence of things as to their originals, cannot want any conformity neceffary to real knowledge.

3. But the complex ideas which we refer to archetypes without us, may differ from them, and fo our knowledge about them may come fhort of being real, and fuch are our ideas of fubftances. Thefe muft be taken from fomething that does or has exifted, and not be made up of ideas arbitrarily put together, without any real pattern. Herein, therefore, is founded the reality of our knowledge concerning fubftances, that all our complex ideas of them muft be fuch, and fuch only, as are made up of fingle ones, as have been difcovered to co-exift in nature; and our ideas being thus true, tho' not perhaps very exact copies, are the fubjects of real knowledge of them. Whatever ideas we have, the agreement we find they have with others, will be knowledge: if thofe ideas be abftract, it will be general knowledge; but to make it real concerning fubftances, it muft be taken from the real exiftence of things: wherever therefore we perceive the agreement or difagreement of our ideas, there is certain knowledge, and wherever we are fure thefe ideas agree with the reality of things, there is certain real knowledge.

Improvement of human KNOWLEDGE. The fentiments of the fame author upon the improvement of our knowledge are as follow: it being the received opinion among men of letters, that maxims are the foundations of all knowledge, and that fciences are each of them built upon certain præcognita, from whence the underftanding was to take its rife, and by which it was to conduct itfelf in its enquiries in the matters belonging to that fcience, the beaten road of the fchools was to lay down, in the beginning, one or more general propofitions called principles or foundations, whereon to build the knowledge that was to be had of that fubject.

That which gave occafion to this way of proceeding, he fuppofes to have been the good fuccefs it feemed to have in the mathematics, which of all other fciences have the greateft clearnefs, certainty, and evidence in them; but if we confider it, we fhall find that the great advancement and certainty of real knowledge men arrive at, in thefe fciences, was not owing to the influence of thefe principles, but to the clear, diftinct, and complete ideas their thoughts were employed about, and the relation of equality and excefs fo clear between fome of them, that they had an intuitive knowledge, and by that a way to difcover it in others, and this without the help of thofe maxims. See the article AXIOM.

The way to improve in knowledge, is not to fwallow principles with an implicit faith, and without examination, which would be apt to miflead men, inftead of guiding them into truth; but to get and fix in our minds clear and complete ideas, as far as they are to be had, and annex to them proper and conftant names, and

thus

thus barely by confidering our ideas, and comparing them together, and obferving their agreement or difagreement, their habitudes and relations, we fhall get more true and clear knowledge by the conduct of this one rule, than by taking up principles, and thereby putting the mind into the difpofal of others.

We muft, therefore, if we proceed as reafon advifes, adapt our methods of inquiry to the nature of the ideas we examine, and the truth we fearch after. General and certain truths are only founded in the habitudes and relations of abftract ideas; therefore a fagacious methodical application of our thoughts, for the finding out thefe relations, is the only way to difcover all that can with truth and certainty be put into general propofitions. By what fteps we are to proceed in thefe, is to be learned in the fchools of the mathematicians, who from very plain and eafy beginnings, by gentle degrees, and a continued chain of reafonings, proceed to the difcovery and demonftration of truths, that appear at firft fight above human capacity. This may reafonably be faid, that if other ideas, that are real as well as nominal effences of their fpecies, were purfued in the way familiar to mathematicians, they would carry our thoughts farther, and with greater evidence and clearnefs, than probably we are apt to imagine.

In our knowledge of fubftances, we are to proceed in quite a different method; the bare contemplation of their abftract ideas (which are but nominal effences) will carry us but a very little way in the fearch of truth and certainty: here experience muft teach us what reafon cannot, and it is by trying alone that we can certainly know what other qualities coexift with thofe of our complex idea; for inftance, whether that yellow, heavy, fufible body we call gold, be malleable or not, which experience (however it prove in that particular body we examine) makes us not certain that it is fo in all or any other yellow, heavy, fufible bodies, but that which we have tried; becaufe it is no confequence, one way or other, from our complex idea. As far as our experience reaches, we may have certain knowledge, and no farther. It is not denied, but that a man accuftomed to rational and regular experiments, fhall be able to fee farther into the nature of bodies and their unknown properties, than one that is a ftranger to them; but this is only judgment and opinion, not knowledge and certainty. This makes our author fufpect that natural philofophy is not capable of being made a fcience from experiments and hiftorical obfervations: we may draw advantages of eafe and health, and thereby increafe our ftock of conveniencies for this life; but beyond this, he fears, our talents do not reach, and gueffes that our faculties are not able to advance further. See the article EXPERIMENTAL PHILOSOPHY.

The ways to enlarge our knowledge as far as we are capable, feem, to be thefe two: the firft is, to get and fettle in our minds, as far as we can, clear, diftinct, and conftant ideas of thofe things we would confider and know. For it being evident, that our knowledge cannot exceed our ideas; where they are either imperfect, confufed, or obfcure, we cannot expect to have certain, perfect, or clear knowledge. The other is the art of finding out the intermediate ideas, which may fhew us the agreement or difagreement, or repugnancy, of other ideas, which cannot be immediately compared. That thefe two, and not the relying on maxims, and drawing confequences from fome general propofitions, are the right method of improving our knowledge in the ideas of other modes, befides thofe of quantity, the confideration of mathematical knowledge will eafily inform us; where we fhall find, that he who has not clear and perfect ideas of thofe angles or figures, of which he defires to know any thing, is thereby utterly incapable of any knowledge about them.

Our knowledge, as in other things, fo in this alfo, has fo great a conformity with our fight, that it is neither wholly neceffary, nor wholly voluntary. Men that have fenfes, cannot choofe but receive fome ideas by them; and if they have memory, they cannot but retain fome of them; and if they have any diftinguifhing faculty, they cannot but perceive the agreement or difagreement of fome of them, one with another: as he that has eyes, if he will open them by day, cannot but fee fome objects, and perceive a difference in them, yet he may choofe whether he will turn his eye towards an object, curioufly furvey it, and obferve accurately all that is vifible in it; but what he does fee, he cannot fee otherwife than he does: it depends not on his will to fee that black, which appears yellow. Juft thus it is with our underftanding; all

all that is voluntary in our knowledge is the employing or withholding any of our faculties from this or that ſort of objects, and a more or leſs accurate ſurvey of them; but they being employed, our will hath no power to determine the knowledge of the mind one way or other; that is done only by the objects themſelves, as far as they are clearly diſcovered.

Knowledge may be uſefully diſtinguiſhed, according to Wolfius, into three kinds; hiſtorical, philoſophical, and mathematical.

Hiſtorical knowledge is merely the knowledge of facts, or of what is or happens in the material world, or within our own minds. Thus, that the ſun riſes and ſets, that trees bud in the ſpring, that we remember, will, &c. are inſtances of hiſtorical knowledge. Philoſophical knowledge is the knowledge of the reaſons of things, or of what is or happens. Thus he has a philoſophical knowledge of the motion of rivers, who can explain how it ariſes from the declivity of the bottom, and from the preſſure which the lower part of the water ſuſtains from the upper. So likewiſe the ſhewing how, and by what reaſon, deſire or appetite ariſes from the perception or imagination of its object, would be philoſophical knowledge. Mathematical knowledge is the knowledge of the quantity of things, that is, of their proportions or ratios to ſome given meaſure. Thus he who knows the proportion of the meridian heat of the ſun at the ſummer ſolſtice to its meridian heat at the winter ſolſtice, might ſo far be ſaid to have a mathematical knowledge of the ſun's heat. So likewiſe he has a mathematical knowledge of the motion of a planet in its orbit, who can diſtinctly ſhew, how, from the quantity of the impreſſed and centripetal force, the velocity of the planet is produced; and how from the action of this double force, the elliptical figure of the orbit ariſes.

Theſe three kinds of knowledge differ evidently, it being one thing to know that a thing is; another, the reaſon why it is; and a third, to know its quantity or meaſure. It is alſo evident, that hiſtorical knowledge, though extenſively uſeful, and the foundation of the reſt, is the loweſt degree of human knowledge. Thoſe who aim at the greateſt certainty ought to join mathematical with philoſophical knowledge. Nothing can more evidently ſhew that an effect ariſes from a certain cauſe, than the knowledge that the quantity of the effect is proportional to the force of the cauſe. Beſides, there are many things in nature, the reaſons of which, depending on certain figures or quantities, are not aſſignable but from mathematical principles.

Philoſophical knowledge is attended with advantages not to be expected from mere hiſtory. See PHILOSOPHICAL.

KNOXIA, in botany, a genus of the tetrandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle infundibuliform petal; and its ſeeds are two, and ſulcated.

KOMORRA, a city of Hungary, ſituated on the Danube, at the eaſt end of the iſland Schut, eaſt long. 28° 12′, north lat. 48° 10′.

KONINGSBURG, a city of Poland, the capital of Ducal Pruſſia and of the king of Pruſſia's Poliſh dominions, ſituated on the river Pregel, near a bay of the Baltic ſea, ſeventy miles north-eaſt of Dantzic: eaſt longitude 21°, and north latitude 54° 40′.

KONINGSGRATZ, a city of Bohemia, ſituated on the river Elbe, eaſt long. 15° 25′, north lat. 50° 15′.

KORAN, or ALCORAN. See ALCORAN.

KOS, in jewiſh antiquity, a meaſure of capacity, containing about 4 cubic inches: this was the cup of bleſſing, out of which they drank when they gave thanks after ſolemn meals, like that of the paſſover.

KOWNO, a city of Poland, in the dutchy of Lithuania, and palatinate of Troki, ſituated on the rivers Wilia and Niemen, eaſt long. 24°, north lat. 55° 5′.

KUFFSTAIN, a city of Germany, in the circle of Auſtria and county of Tyrol, ſituated on the river Inn, eaſt long. 12° 12′, north lat. 47° 32′.

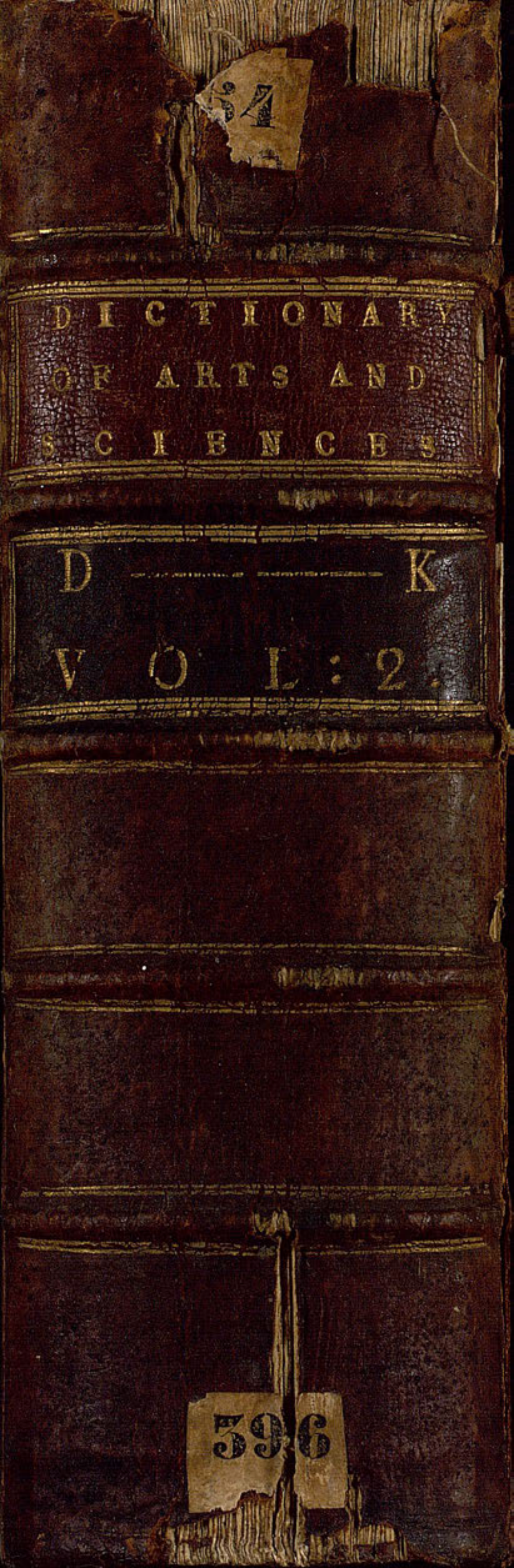
KUR, the antient Cyrus, a river of Perſia, which riſes in the mountains of Georgia, and running ſouth-eaſt by Teflis, unites its ſtreams with the river Arras (the antient Araxes) and falls into the Caſpian ſea, ſouth of Baku.

KYPHONISM, in antiquity, a kind of puniſhment, otherwiſe called cyphoniſm. See the article CYPHONISM.

KYSTIS, or CYSTIS, in anatomy. See the articles CYST and CYSTIS.

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